Can cognitive analytic therapy (CAT) treat chronic and complex hoarding? A hermeneutic single case efficacy design (HSCED) evaluation.

Claire Spence

Submitted for the award of Doctorate of Clinical Psychology

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Declaration

This thesis has been submitted for the award of Doctorate in Clinical Psychology at The University of Sheffield. It has not been submitted for any other qualification or to any other academic institution.

Word counts

Literature review	8,015
Including references	9,804
Including references and appendices	10,166
Research report	9,092
Including references	10,664
Including references and appendices	20,816
Total word count	17,107
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Including references and appendices	30,982

Abstract

Literature Review: A systematic review of the literature relating to self-reported impulsivity, self-control and hoarding. Fourteen papers capturing 18 separate studies were eligible for inclusion. Three major categories of self-report measures were employed: impulsivity, self-control and personality. Overall, findings were contradictory with studies providing support both for the presence and absence of a significant relationship between impulsivity/self-control and hoarding behaviours. Disparate measurement tools showed little convergence of findings. This inconsistency of findings reflects a pattern in the wider impulsivity and self-control literature. Clinical implications of the presence of impulsive features/traits in Hoarding Disorder are considered. Methodological limitations and recommendations for future research are outlined.

Research Report: An adjudicated hermeneutic single case efficacy design (HSCED) explored the treatment of Hoarding Disorder (HD) with cognitive analytic therapy (CAT). Quantitative and qualitative outcomes created a rich case record subsequently debated by affirmative (*N*=3) and skeptic (*N*=3) research teams. This debate was viewed by expert independent judges (*N*=3) who returned a unanimous verdict that CAT was inefficacious, with lack of change on validated hoarding measures central to their judgement. Findings are considered in relation to methodological limitations, viability of the adjudicated HSCED methodology and the potential role of analytically informed treatment of HD.

Acknowledgements

First, I would like to express my gratitude to the client whose treatment became the focus of this thesis. Without willingness to share his experience, this research would not have been possible.

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Section One: Literature Review

Impulsivity, self-control and hoarding:

A systematic review

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Abstract

Objectives. Indirect evidence points to the presence of impulsive features in Hoarding Disorder (HD). A systematic review of the literature relating to self-reported impulsivity, self-control and hoarding was conducted to clarify the relationship between these constructs.

Methods. Two electronic databases (Medline and PsychInfo) were searched with papers identified using predefined inclusion and exclusion criteria. A quality appraisal tool was used to assess methodological quality.

Results. A total of 14 papers, capturing 18 studies, were included in the review. Main study characteristics are outlined followed by a summary of quality ratings and an introduction to the primary measures. Study findings are synthesised according to category of self-report measure: impulsivity (*n*=7), self-control (*n*=8), and personality (*n*=3). Support was found for a possible relationship between lower self-control and greater severity of hoarding. Findings were less clear on the impulsivity and personality measures, where the presence and absence of a relationship with hoarding was indicated. Poor convergence of findings is consistent with the wider impulsivity and self-control literature. Methodological limitations are detailed with considerations given to clinical implications and future research directions.

Conclusions: The paucity of high quality research prevents definitive conclusions as to the possible role of impulsive features in hoarding. Findings indicate that further methodologically sound research is nevertheless justified.

Introduction

Impulsiveness is one of the most frequently cited symptoms in the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association [APA], 2013). This suggests that impulsive features are a prominent characteristic of a wide range of mental health problems (Arce & Santisteban, 2006; Evenden, 1999; Rasmussen, Brown, Steketee, & Barlow, 2013). Poor impulse control and greater impulsive behaviour is consistently linked with a range of negative outcomes (Morean et al., 2014). Conversely, greater self-control been linked to increased psychological wellbeing and social/occupational functioning (Baumeister, Gailliot, DeWall, & Oaten, 2006; Tangney, Baumeister, & Boone, 2004). Impulsivity is therefore an important consideration in the formulation of many mental health problems.

Hoarding Disorder

A disorder where less is known about the presence of impulsive features is Hoarding Disorder (HD). HD is conceptualised as persistent difficulties discarding objects irrespective of their value, subjective distress upon discard, the saving of objects which result in severe levels of clutter and inaccessible living environments, and significant levels of distress and functional impairment (APA, 2013). Often these difficulties are accompanied with excessive levels of acquisition, most commonly by means of purchasing or collecting objects, but also for a proportion of individuals by stealing (Frost, Rosenfield, Steketee, & Tolin, 2013).

Estimated prevalence rates suggest that HD is relatively common; around 2% to 6% in western countries (Iervolino et al., 2009; Samuels et al., 2008a). Rates of co-morbidity are also high with approximately 75% meeting diagnostic criteria for depression and/or anxiety (Frost, Steketee, & Tolin, 2011).

Difficulties with hoarding typically develop during adolescence, but treatment is often not sought until symptoms are particularly severe, usually much later in an individual's life (Grisham, Frost, Steketee, Kim, & Hood, 2006). Treatment of hoarding using cognitive behavioural therapy has shown some success with a recent meta-analysis reporting significant symptom reduction with a large effect size (Tolin, Frost, Steketee, & Muroff, 2015). Poor homework compliance, fluctuating levels of motivation and frequent relapses are however reported to be common challenges (Muroff et al., 2009; Steketee, Frost, Tolin, Rasmussen, & Brown, 2010). Insight into hoarding is also reported to vary, with DSM diagnostic criteria including the specifier of good, poor or absent levels of insight (APA, 2013).

Impulsive compulsive spectrum

DSM–5 places HD within Obsessive Compulsive Disorders (OCD) and Related Disorders. This placement reflects the assumed similarity between HD and conditions believed to be characterised by cognitive preoccupation, compulsions and repetitive acts (e.g. OCD, trichotillomania and excoriation; APA, 2013). Current conceptualisations place HD at the compulsive end of the compulsive – impulsive spectrum of disorders (Timpano et al., 2013). These two constructs are typically viewed as opposite ends of the same

spectrum with compulsive and impulsive behaviours motivated by opposing forces (Fineberg et al., 2010). Compulsive behaviour/disorders are motivated by an avoidance of harm, whilst impulsive behaviours/disorders are motivated by reward and excitement (Fineberg et al., 2010). Researchers have begun to question whether both compulsive and impulsive features can be present in the same disorder (Fineberg et al., 2010; Timpano et al., 2013).

Impulsivity and self-control. In the pursuit of a more comprehensive understanding of the construct of impulsivity, numerous attempts have been made to both define the concept and identify component factors. Unfortunately, this has resulted in little consensus and created a large number of definitions, with differing terminology, factors and aspects (Arce & Santisteban, 2006; Rasmussen et al., 2013). Whilst a full review of the literature relating to the concept of impulsivity is beyond the scope of this review, a brief summary of the relevant concepts are outlined.

Kocka and Gagnon (2014) identified four commonalities in definitions of impulsivity: (i) action without forethought and planning; (ii) inability to inhibit or resist urges/impulses or distractions; (iii) limited behavioural regulation and inhibition, and (iv) sensation seeking. Some researchers have also suggested that the concept of self-control is inherent in the study of impulsivity and represents a distinct but overlapping process (Kuhn, 2013). Definitions of self-control focus on the capacity to override and control impulses/urges, to reduce behavioural expression (Baumeister et al., 2006). Despite impulsivity and self-control being viewed as operating simultaneously, measurement of both concepts is recommended (Kuhn, 2013).

The multi-dimensional nature of impulsivity and self-control has led to two distinct forms of measurement, arising out of differing theoretical paradigms (Cyders & Coskunpinar, 2011; Kocka & Gagnon, 2014). Self-report measures have arisen from personality theories viewing impulsivity and self-control as stable personality traits, whilst experimental tests originate largely in neuropsychological and cognitive paradigms viewing impulsivity and self-control as state like processes (Cyders & Coskunpinar, 2011).

Findings from self-report and experimental tests show little convergence (Cross, Copping, & Campbell, 2011), leading to suggestions that these two distinct forms of measurement tap into different constructs (Cyders & Coskunpinar, 2011). Accordingly, there is a need for transparency with studies identifying the specific constructs under investigation and the underlying theoretical perspective (Kocka & Gagnon, 2014; Miller, 2003).

Impulsive features in HD. Impulsive features are notably absent from the widely accepted theoretical model of hoarding (Steketee & Frost, 2007). However, this model recognised that hoarding was multifaceted and identified personality traits as one source of vulnerability contributing to hoarding behaviours (acquisition, difficulty discarding and clutter), with further refinement recommended as relevant constructs were identified. One hypothetical link between impulsivity and hoarding may lie within the excessive levels of acquisition frequently reported. Reduced impulse control may therefore contribute directly to the acquisition of new objects and indirectly via the accumulation of clutter.

Indirect evidence of the presence of impulsive features in HD comes from the overlap between HD and disorders characterised by poor impulse control, poor self-control or poor self-regulation such as addictions and impulse control disorders (APA, 2013; Evenden, 1999; Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). Akin to HD, the defining features of these conditions is (i) an inability to resist cognitive and emotional impulses despite such impulses often contradicting long term goals, and (ii) the subjective experience of relief or pleasure upon behavioural response and action consistent with such impulses (APA, 2013; Steketee & Frost, 2007). This similarity appears to suggest that reward seeking may also be a motivating factor in HD (Grisham, Brown, Liverant, & Campbell-Sills, 2005). Table 1 depicts the likely symptom overlap in impulsive features between HD and a range of psychiatric disorders in which impulse control deficits are believed to be present.

The presence of impulsive features is also reflected in DSM-5 (APA, 2013) diagnostic criteria for HD, which includes the specifier of excessive acquisition. Up to 90% of all individuals with HD present with ongoing difficulties with acquisition (APA, 2013; Frost et al., 2013). Excessive acquisition is reported to share many similarities with compulsive buying (CB), including the presence of overwhelming urges and positive emotional experiences upon successful acquisition of a new object (Müller, Mitchell, & de Zwaan, 2013). Currently CB is diagnosed as an impulse control disorder not otherwise specified in DSM-5 (APA, 2013).

In addition, impulsive features appear consistent with the theoretical model of HD which identifies the contributory role of cognitive deficits

(Steketee & Frost, 2007; Timpano et al., 2013). Studies exploring the relationship between cognitive deficits and HD have employed neuropsychological tests, which typically tap into more than one area of cognitive function (e.g. decision making and attention). Woody, Kellman-McFarlane, & Welsted (2014) reviewed the HD literature according to each cognitive domain. Subsequently, they concluded that despite some inconsistency in findings, deficits (in comparison to healthy and clinical controls) in problem solving/decision making, attention, memory and organisation showed some replicability. Research examining impulsivity however showed little consistency, with studies indicating both the presence and absence of deficits in those with hoarding problems when assessed using both similar and disparate response inhibition tests (e.g. Stroop test, Balloon Analogue Risk Task). Consequently, Woody et al. suggested that further and more detailed research into response inhibition was needed.

Researchers have also explored the link between HD and attention deficit hyperactivity disorder (ADHD); a condition characterised by hyperactivity in which impulsivity is a key feature. Research into HD and ADHD provide a more consistent picture, with studies suggesting these two conditions are frequently co-morbid. ADHD symptoms, particularly inattention, are also reported to be a strong predictor of hoarding symptoms, with cognitive deficits suggested as the likely source of overlap (Lynch, McGillivray, Moulding, & Byrne, 2015).

Table 1:

Suggested symptom overlap in impulsive features across disorders

Characteristic of impulsivity	Hoarding disorder	Compulsive buying	Other impulse control disorders	Addictions	Personality disorders	ADHD	Bipolar
Difficulties resisting urges/impulses	●	●	●	●	●	●	●
Impaired self-regulation/self-control	●	●	●	●	●	●	●
Behaviour in opposition to long term goals	●	●	●	●		●	●
Behaviour is positively reinforcing: pleasure, gratification, comfort, relief	●	●	●	●			
Inability to delay gratification/immediate rewards			●	●	●	●	●
Behavioural avoidance of negative affect	●	●	●	●	●		
Risky behaviour/sensation seeking			●	●	●	●	●
Attentional deficits (e.g. distractibility)	●				●	●	●
Impaired decision making (e.g. acting without thinking)	●	●	●		●	●	●
Deficits in planning	●				●	●	●

Note: Characteristics of impulsivity identified from the literature; DSM-5 diagnostic criteria used to identify possible impulsive features in hoarding disorder, impulse control disorders, addictions, personality disorders, ADHD and bipolar disorder (APA, 2013); Müller et al., 2013 used for compulsive buying.

Rationale for systematic review

Despite indirect evidence indicating the presence of impulsive features in HD, it is unclear whether this relationship is supported by empirical research. This is particularly true for self-reported impulsivity and self-control, arising from personality trait theories. Clarity as to whether impulsivity is a feature of HD may facilitate greater understanding as to the many challenges of treating this condition (Rasmussen et al., 2013). Impulsiveness in those with hoarding may suggest the need for bespoke interventions targeting impulsivity (Timpano & Schmidt, 2010). Alternatively, different frameworks for understanding the symptoms of hoarding and the function of possible therapy interfering behaviours may be evident (Rasmussen et al., 2013).

Aims of present review

The aim of this review is to synthesise the current literature in relation to impulsivity, self-control and HD. Specifically, this review aims to:

- Identify research using self-report measures of impulsivity and self-control in those with hoarding difficulties.
- Synthesise and critically evaluate the findings from this evidence base.
- Assess whether current research supports the presence of impulsive features in hoarding.

Method

Search strategy

In January 2015 a preliminary search was conducted to identify an extensive list of search terms relating to the topic under review. Subsequently, a comprehensive search of two electronic journal databases

(Medline via Pubmed and PsychINFO via OvidSP) was conducted. Both electronic databases were searched within a three month period (January 2015 to March 2015). Search terms are detailed in Table 2. Search terms were combined using the Boolean operator 'AND'. Terms were applied to all fields with no restrictions.

Table 2:

Identified search terms

	Search terms
	hoarding +/- disorder, obsessive compulsive +/- disorder
AND	
	impulse control +/- disorder, self-control, impulsivity, novelty seeking, harm avoidance, risky behaviour, sensation seeking, (dis)inhibition, self-discipline, impulsiveness, self-regulation
	Hoarding +/- disorder
AND	
	intermittent explosive disorder, pyromania, fire setting kleptomania, gambling, trichotillomania, skin-picking, compulsive sexual behaviour, internet use, compulsive buying, personality

Duplicate records, books and articles in all languages other than English were removed. All remaining records were screened, initially by title and if necessary by abstract. Papers deemed relevant to the topic area were then accessed in full. Reference lists and cited papers were searched by hand. Both electronic databases were again searched in September 2015 to check for recent published papers. Final eligibility was assessed using defined inclusion and exclusion criteria. A Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA; Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) flow diagram depicting the search process is shown in Figure 1.

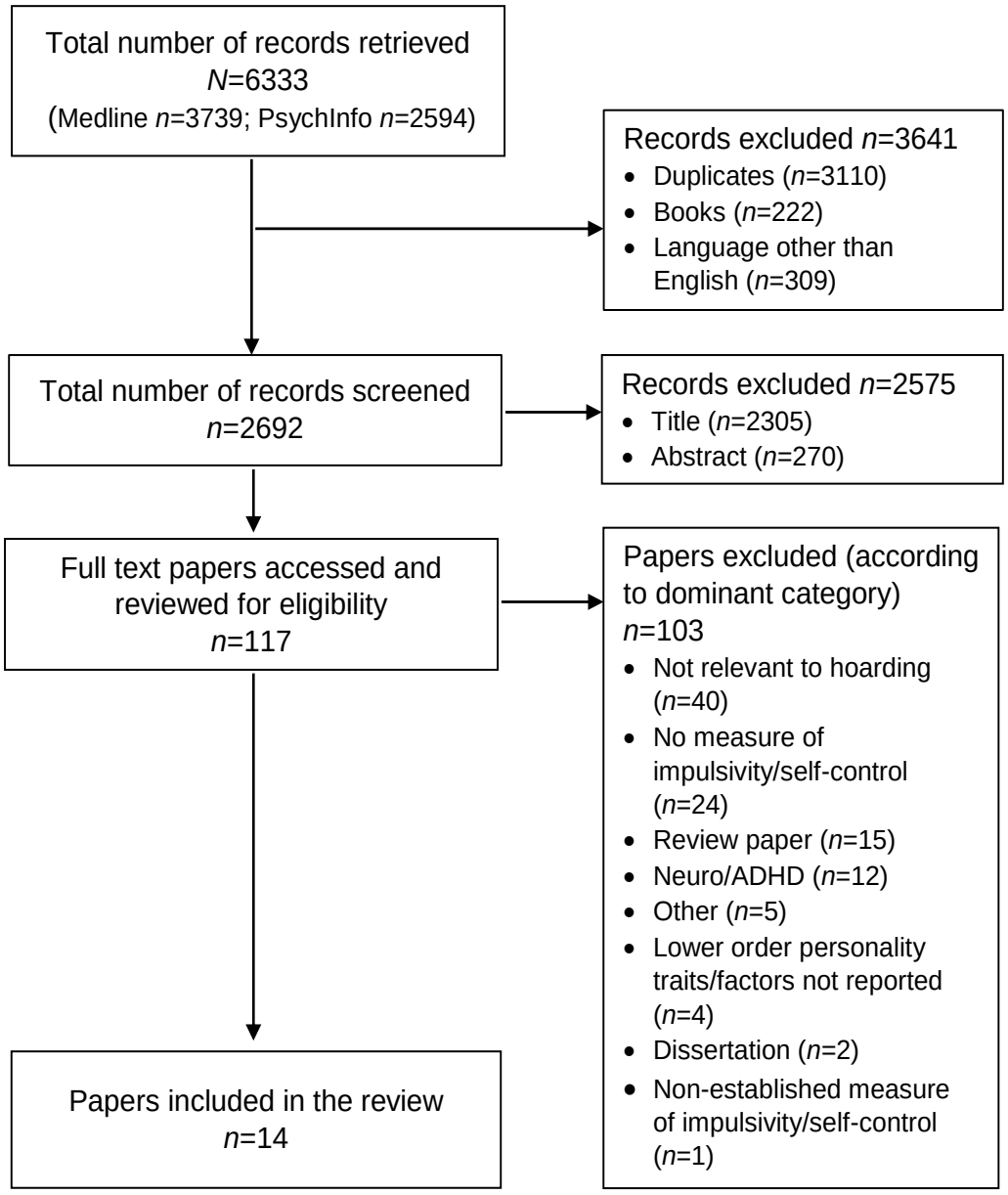

Figure 1:

PRISMA flow diagram of search process

Inclusion/exclusion criteria

Papers were required to meet the following criteria: (i) inclusion of a validated measure assessing hoarding behaviours/symptoms; (ii) inclusion of

an established self-report measure assessing constructs comparable to impulsivity or self-control; (iii) studies of any design that reported the association between hoarding symptoms and relevant constructs of (self-report) impulsivity or self-control.

Papers were excluded if they met the following: (i) not published in a peer reviewed journal; (ii) studies that employed self-report personality measures, with only the higher order traits/factors reported.

Quality appraisal

Quality was assessed using the Joanna Briggs Institute (JBI) critical appraisal checklist for observational studies (JBI, 2007). The JBI is a respected organisation promoting the systematic review of primary research, with standardised critical appraisal checklists established for differing research designs. The checklist for observational studies is a generic measure capable of assessing quality in non-experimental studies (e.g. correlational, case-control). The observational checklist was selected based on ease of assessment and dominant study design (*n*=15). The checklist contained five broad methodological questions with the following responses indicated: ‘yes’, ‘no’, ‘unclear’ or ‘not applicable’ (Appendix A). Question three was amended as the review focused on self-report measures. As no scoring instructions were indicated, a score of one was attributed to all questions with a ‘yes’ response. The brevity of the checklist also allowed for the addition of three novel items specific to the focus of the review: (i) assessment of hoarding, (ii) co-morbidity, and (iii) number of self-report measures of impulsivity/self-control. A maximum score of five was derived from these

three items. The critical appraisal checklist and the three novel items were combined giving a maximum quality score of 10. The maximum quality score was adjusted as necessary to account for items deemed not-applicable. Multiple studies reported in any one paper were given an overall quality score. High quality was not a requirement for inclusion, due to the small number of papers retrieved. The process of appraisal was therefore conducted to identify common methodological issues future studies may need to consider.

A random sample (50%) of papers were assessed by an independent rater using the same criteria. The independent rater was a third year trainee clinical psychologist who was blind to the author's ratings until they had completed their assessment. Initial reliability analysis indicated a high level of agreement with a Cronbach's alpha of .96. Subsequent discussion enabled any disagreements to be considered and a consensus reached.

Results

Fourteen papers (totalling 18 separate studies) were included in the review. The main study characteristics are outlined followed by a brief review of the quality ratings and primary measures. Study findings are reviewed according to category of self-report measure: (i) impulsivity, (ii) self-control, or (iii) personality. All studies investigated a range of different constructs. Only information relevant to the specific focus of this review is reported (see Tables 3, 4, & 5).

Table 3:

Impulsivity measure

Author(s) & date	Focus	Design	Sample	Measure(s)	Group allocation	Analysis	Quality score
Fitch & Cougle (2013)	Cognitive deficits in nonclinical hoarding	Cross-sectional	Non-clinical, United States, university sample, *N*=73 (40 female, *M*age=18.97 [*SD*=1.79])	•HRS-SR •HRS-I •SI-R •BIS-11 •DASS-21 •OCI-R (minus H)	•Non-clinical H: HRS-SR ≥ 4; HRS-I: ∑ of acquisition, discarding & cutter ≥ 2 & impairment & distress each < 4; SI-R ≥ 17; *n*=36 (22 female, *Mage*=18.61 [*SD*=1.05]) •Control: HRS-SR = 0; HRS-I: ∑ of acquisition, discarding & clutter ≤ 1 & impairment & distress each = 0; SI-R ≤ 10; *n*=37 (18 female, *M*age=19.7 [*SD*=2.85])	Chi-square, ANOVA, ANCOVA: Groups	7/9
Hezel & Hooley (2014)	Creativity in hoarding	Cross-sectional	Non-clinical, United States, community sample, *N*=80 (46 female, *M*age=26.4 [*SD*=11.3])	•SI-R: •SCI •BIS-11	•Clinical H: SI-R ≥ 41; *n*=20 (*M*SI-R=54.3 [*SD*=9.03]) •Low H: SI-R ≤ 40; *n*=60 (*M*SI-R=17.53 [*SD*=11.31])	T-test: Groups, Pearson's correlation: Full sample	6/9
Mueller et al. (2007)	Hoarding in a compulsive buying sample	Cross-sectional	Non-clinical, Germany, community sample meeting proposed diagnostic criteria for CB *N*=66 (55 female, *M*age=41.2 [*SD*=10.1])	•SI-R (translated into German) •BIS-11 G •SCID	•H CB: SI-R ≥ 41; *n*=41 (*M*SI-R=63.3 [*SD*=14.1]) •Non-H CB: SI-R ≤ 40; *n*=25 (*M*SI-R=31.0 [SD=7.4])	Pearson's correlation: Full sample, Mann-Whitney test: Groups	6/9

Rasmussen et al. (2013)	Impulsivity in hoarding	Cross-sectional	Clinical & non-clinical, United States, university research program, community and anxiety clinic, *N*=64 (41 female, age 19-79)	•ADIS-IV •HRS-I •HRS-SR •UPPS	•H: ADIS-IV: H identified as most interfering or distressing disorder; HRS-I ≥ 16; *n*=32 (22 female, *M*age=61.0 [*SD*=7.9]) •Anxiety: ADIS-IV: meeting diagnostic criteria for other anxiety disorder; HRS-I ≤ 15; *n*=32 (19 female, *M*age=33.1 [*SD*=12.4])	T-test: Groups, Multiple regression: Groups & H, Pearson's correlation: H	8/9
Timpano et al. (2013)	Impulsivity in hoarding	Cross-sectional	Non-clinical Study 1: United States, university sample, *N*=372 (68% female, *M*age=19.18 [*SD*=2.4]) Study 2: Germany, university sample, *N*=160 (84% female, *M*age=21.5 [*SD*=2.0])	•SI-R •BIS-11 •OCI-R (minus H) •BAI •BDI •RAPI •GCHI •UPPS •OCI-R (minus H) •BDI •STAI	•High H: *M*SI-R ≥ 18.8; *n*=183 •Low H: *M*SI-R < 18.8; *n*=189 •Clinical H: SI-R ≥ 41; *n*=24 •Non-H: SI-R ≤ 40; *n*=348 •High H: *M*GCHI ≥ 14.5; *n*=73 •Low H: *M*GCHI < 14.5; *n*=84 •Clinical H: GCHI ≥ 29; *n*=13 •Non-H: GCHI ≤ 28; *n*=147	Pearson's correlation: Full sample, ANCOVA: Groups, Linear regression: Full sample	7/9
Zermatten & Van der Linden, (2008)	Impulsivity in non-clinical OCD	Cross-sectional	Non-clinical, university sample, *N*=220 (112 female, *M*age=25.49 [*SD*=4.17])	•OCI-R F •UPPS F •BDI		Pearson's correlation Multiple regression	2/8

Note: H = Hoarding; HRS-SR = Hoarding Rating Scale-Self-Report; HRS-I = Hoarding Rating Scale-Interview; SI-R = Savings Inventory-Revised; BIS-11 = Barratt Impulsiveness Scale Version 11; DASS-21 = Depression Anxiety Stress Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; SCI = Saving Cognitions Inventory; CB = Compulsive buying; BIS-11 G = BIS German Version; SCID = Structured Clinical Interview for DSM-IV; ADIS-IV = Anxiety Disorder Interview Schedule for DSM-IV; UPPS = UPPS Impulsive Behavior Scale; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; RAPI = Rutgers Alcohol Problems Index; GCHI = German Compulsive Hoarding Inventory; STAI = State-Trait Anxiety Inventory; OCI-R F = OCI-R French Version; UPPS-F = UPPS French Version.

Table 4:

Self-control measure

Author(s) & date	Focus	Design	Sample	Measure(s)	Group allocation	Analysis	Quality score
Frost et al. (2013)	Excessive acquisition in HD	Cross-sectional	Non-clinical, United States, community sample, *N*=526	•HRS-SR •SI-R •BSCS •AQ •CFQ •DASS-21 •OCI-R	•Clinical H: HRS-SR ≥ 4 on clutter, difficulty discarding and either distress or impairment; *n*=369 (94.3% female, *M*age=53.47 [*SD*=9.7]) ○ Acquirers: *n*current=220; *n*past=103; *n*non=46	Pearson's correlation & multiple regression: Full sample, Games-Howell test: Acquirers	6/9
Hall, Tolin, Frost, & Steketee (2013)	Co-morbidity in hoarding	Cross-sectional	Non-clinical, United States, community sample, *N*=363 (95% female, *M*age=52.8 [*SD*=10.3])	•HRS-SR •BSCS •DASS-21 •ADHD SS •OCI-R	Latent class analysis	Latent class analysis: Full sample, Logistic regression & t-test: Latent class groups	5/9
O'Sullivan et al. (2010)	Hoarding in Parkinson's disease (PD)	Cross-sectional	Clinical, United Kingdom, specialist PD outpatient clinic, *N*=99 (24 female, *Mage*=64.4 [*SD*=10.1])	•SI-R •BSCS •OCI-R	•Excessive H: SI-R ≥ 41; *n*=12 (2 females, *M*age=60.6 [*SD*=10.6]) •Low H: SI-R ≤ 40; *n*=87, (22 females, *M*age=64.9 [*SD*=9.9])	T-test: Groups, Pearson's correlation: Full sample	6/9
Timpano & Schmidt (2010)	Self-control in hoarding	Case report & experiment	Clinical, United States, university health clinic Study 1: *N*=1 (female, age 31) Study 2: *N*=1 (female, age 50)	•SCID •SI-R •SCI •SCS •CIR •Discarding task		Norm comparisons, Pre – Post comparisons	6/8

Timpano & Schmidt (2013)	Self-control in hoarding	Cross-sectional & experiment	Non-clinical & clinical, United States			9/10
			Study 1: University sample, *N*=484 (57.4% female, *M*age=19 [*SD*=1.9])	• SI-R • BSCS • BAI • BDI • OCI-R: O • PSWQ • EDI-B • RAPI	Pearson's correlation & multiple regression	
			Study 2: Specialised university clinic, *N*=135 (70.3% female, *M*age=34 [*SD*=14.6])	• SCID • SI-R • BSCS • GAF • DASS-21	• H: H symptoms during SCID; SI-R ≥ 41; *n*=19 • OCD (*n*=23), SAD (*n*=64), GAD (*n*=29): SCID; SI-R ≤ 40	ANOVA & ANCOVA: Groups
			Study 3: University sample, *N*=102 (63.7% female, *M*age=19.6 [*SD*=1.88])	• SI-R • BSCS • DASS-21 • Discarding task	• Self-control depletion task *n*=56; non depletion *n*=46	Partial correlation: Full sample, Multiple regression: groups

Note: H = Hoarding; HRS-SR = Hoarding Rating Scale-Self-Report; SI-R = Savings Inventory-Revised; BSCS = Brief Self-Control Scale; AQ = Acquisition questions developed for study; CFQ = Cognitive Failures Questionnaire; DASS-21 = Depression Anxiety Stress Scale; OCI-R = Obsessive-Compulsive Inventory-Revised; ADHD SS = Attention Deficit Hyperactivity Disorder Symptom Scale; SCID = Structured Clinical Interview for DSM-IV; SCI = Saving Cognitions Inventory; SCS = Self Control Scale (36 item); CIR = Clutter Image Rating; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; OCI-R: O = OCI-R Obsessions only; PSWQ = Penn State Worry Questionnaire; EDI-B = Eating Disorder Inventory-Bulimia Subscale; RAPI = Rutgers Alcohol Problems Index; GAF = Global Assessment of Function; OCD = Obsessive Compulsive Disorder; SAD = Seasonal Affective Disorder; GAD = Generalised Anxiety Disorder.

Table 5:

Personality measure

Author(s) & date	Focus	Design	Sample	Measure(s)	Group allocation	Analysis	Quality score
Fullana et al. (2004)	OCD and personality	Cross-sectional	Clinical, Spain, outpatient sample, primary diagnosis of DSM OCD, *N*=56 (41% female; *M*age=28.3 [*SD*=8])	• Y-BOCS-SC • SPSRQ S • EPQ S • Semi-structured interview		Pearson's correlation & multiple regression	4/8
LaSalle-Ricci et al. (2006)	Hoarding dimension in OCD & personality	Cross-sectional	Clinical, United States, outpatient sample, diagnosis of DSM OCD, *N*=204 (62.9% female)	• SI-R • NEO-PI-R • SCID		Pearson's correlation	6/8
Samuels et al. (2008b)	Gender differences in hoarding in OCD	Cross-sectional	Clinical, United States, outpatient sample, diagnosis of DSM OCD, *N*=509, (385 female; *M*age=41)	• Y-BOCS-SC • NEO-PI-R (completed by *n*=318) • SCID	H: H subscale on Y-BOCS-SC, *n*=199 (61 female) and clinician assessed	Multiple regression: Groups	5/9

Note: H = Hoarding; Y-BOCS-SC = Yale-Brown Obsessive-Compulsive Scale - Symptom Checklist; SPSRQ S = Sensitivity to Punishment Sensitivity to Reward Questionnaire Spanish Version; EPQ S = Eysenck Personality Questionnaire Spanish Version; SI-R = Savings Inventory-Revised; NEO-PI-R = NEO-Personality Inventory-Revised; SCID = Structured Clinical Interview for DSM-IV.

Study characteristics

Seven studies employed an established impulsivity measure (Table 3), eight a self-control measure (Table 4), and three a measure of personality (Table 5). The majority (*n*=15) of studies employed a cross-sectional design, in which participants completed a battery of measures. Three studies employed an experimental design. Ten studies used nonclinical samples, predominantly recruited from university sites (*n*=6). Thirteen studies were conducted in the United States of America. Source country was unclear for one study.

Quality ratings

Assessment of quality provided mixed results (Appendix B). Nine papers scored within the middle range (rating 4 - 6) with only one paper rated as poor quality (Zermatten & Van der Linden, 2008). One paper was rated out of a maximum score of ten, due to the use of random sampling in the experimental study (Timpano & Schmidt, 2013). Four papers identified hoarding during clinical interview with purely self-report measures relied on in ten. One paper did not describe the comparison groups in sufficient detail (Hall et al., 2013). Errors were observed in the results reported in one paper (Timpano & Schmidt, 2010). Diagnostic co-morbidity (Diagnostic and Statistical Manual of Mental Disorders [DSM]) was assessed by clinical interview in seven papers. No individual study used more than one self-report measure to assess impulsivity/self-control, although Timpano et al. (2013) employed a different measure in each of their study samples.

Primary measures

Clinical interviews were conducted using the Structured Clinical Interview for DSM (SCID; First, Spitzer, Gibbon, & Williams, 2002), Anxiety Disorders Interview Schedule for DSM (ADIS; Di Nardo, Brown, & Barlow, 1994), or the Hoarding Rating Scale-Interview (HRS-I; Tolin, Frost, & Steketee, 2010). The HRS-I is an established interview schedule assessing hoarding severity.

Self-report measures included the Hoarding Rating Scale Self-Report (HRS-SR; Tolin et al., 2010), Savings Inventory-Revised (SI-R; Frost, Steketee, & Grisham, 2004), German Compulsive Hoarding Inventory (GCHI; Mueller et al., 2009), Yale-Brown Obsessive-Compulsive Scale Symptom Checklist (Y-BOCS-SC; Goodman et al., 1998), and the Obsessive-Compulsive Inventory-Revised (OCI-R; Foa at al., 2002). The HRS-SR, SI-R and GCHI are specifically designed to assess the main features of hoarding: difficulty discarding, acquisition and clutter. In contrast the Y-BOCS-SC and OCI-R are measures of obsessive compulsive disorder (OCD) symptoms which include one hoarding domain.

Impulsivity was assessed using the Barratt Impulsiveness Scale Version 11 (BIS-11; Patton, Stanford, & Barratt, 1995) or UPPS Impulsive Behaviour Scale (UPPS; Whiteside & Lynam, 2001). Both measures provide a total score made up of three (attentional, nonplanning and motor) and four (urgency, perseverance, premeditation and sensation seeking) subscales respectively. The Self-Control Scale (SCS; Tangney et al., 2004) was used to assess self-control (e.g. self-discipline, impulsive acts) although the brief 13

item scale was more common (BSCS). Two personality measures assessed constructs of impulsivity/self-control; Sensitivity to Punishment Sensitivity to Reward Questionnaire (SPSRQ; Torrubia, Åvila, Moltó, & Caseras, 2001) and NEO-Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1992). The SPSRQ distinguishes sensitivity to reward from sensitivity to punishment, whereas the NEO-PI-R assess five separate personality domains (e.g. neuroticism).

Study findings

Impulsivity measure. Fitch & Cougle (2013) used the BIS-11 to compare impulsivity in a sample of undergraduate students allocated into one of two groups (a nonclinical hoarding and a comparison group) according to predefined scores on three hoarding measures. The study groups did not differ on demographic factors (e.g. gender, race), although the comparison group were significantly older. Subsequent analysis (controlling for age) showed that the nonclinical hoarding group scored significantly higher on the three BIS subscales of non-planning ([Cohen's] d=.80, p<.01); motor ([Cohen's] d=.78, p<.01), and attentional ([Cohen's] d=1.72, p<.001) impulsivity than the comparison group. The BIS total scores were not reported. Further analysis with self-reported depression, anxiety, and OCD symptoms entered as covariates revealed the same pattern of results. Of note, the mean scores for both groups were considered to be within the 'normal' range.

Hezel & Hooley (2014) employed the BIS-11 to compare impulsivity in a community sample. Participants were divided into two groups based on

their total score on the SI-R with those in the clinical hoarding group scoring above the previously defined cut-off of 41 (Frost & Hristova, 2011). Consistent with Fitch & Cougle (2013), analysis revealed that the clinical group had higher levels of impulsivity than the low hoarding comparison group ([Cohen's] d=.74, p<.01). However, only the BIS total scores were compared with the three subscales not reported for either group. Subsequent analysis using the total sample revealed a significant positive relationship (r=.41; p<.001) between hoarding symptoms, as measured by the SI-R, and impulsivity. Subscales of both measures were not reported. Correlational analysis also revealed a non-significant positive relationship (r=.21; p>.05) between the Saving Cognitions Inventory (SCI; Steketee, Frost, & Kyrios, 2003), measuring hoarding related cognitions, and impulsivity.

Mueller et al. (2007) explored hoarding and impulsivity in a community sample meeting proposed diagnostic criteria for compulsive buying (McElroy, Keck, Pope, Smith, & Strakowski, 1994). Analysis revealed no significant correlations between impulsivity (BIS-11) and the SI-R total score, difficulty discarding subscale or the clutter subscale. However, a significant positive correlation (r=.31; p<.05) was revealed between the acquisition subscale and impulsivity. In addition all participants were allocated into one of two groups, hoarding compulsive buying and non-hoarding compulsive buying, dependent on their SI-R total score (≥ 41 or ≤ 40 respectively). Group comparison revealed no significant differences in impulsivity. Of note, Mueller et al. stated that both groups demonstrated mean BIS scores, 85.8 and 83.5, greater than the proposed cut-off value of 60. However, it is unclear whether this cut-off value is supported by research, as no references are cited.

Rasmussen et al. (2013) used the UPPS to measure impulsivity in a clinical anxiety and a self-identified hoarding group. Group allocation was based on clinical interviews, with the hoarding group also required to score above the clinical cut-off on the HRS-I (≥ 16). Group comparison revealed no significant differences on any of the four UPPS subscales. Multiple regression analysis indicated that a hoarding diagnosis was a significant and unique predictor (p=.04) of the UPPS subscale of urgency, when comorbidity (social phobia, generalised anxiety disorder, and major depression only) was controlled for. Due to the significant age differences observed, age followed by age and comorbidity were controlled in two subsequent analyses. On both occasions no significant differences between the two groups was observed. Hoarding symptoms (as assessed by the HRS-SR) also failed to uniquely predict impulsivity in the hoarding group. In addition, no significant correlations were evident between the scores on each of the HRS-SR subscales (acquisition, difficulty discarding and clutter) and impulsivity.

Timpano et al. (2013) examined impulsivity in two national samples. In the U.S sample SI-R total, acquisition and clutter subscales were correlated with total BIS and all three subscales (range r=.12 to r=.42; p<.05). This differed for SI-R difficulty discarding where no relationship was evident with non-planning impulsivity. In the German sample, total GCHI and the three subscales showed a significant relationship with impulsivity (UPPS total range r=.27 to r=.41; p<.001). However, only urgency (range r=.34 to r=.44; p<.001) and lack of perseverance (range r=.25 to r=.35; p<.001) were consistent across GCHI scores. Comparison of high/low and clinical/nonclinical groups (when controlling for all other study variables)

revealed the same pattern of results within each sample. Namely, clinical and high hoarding groups had greater impulsivity as measured by the BIS total, attentional and motor subscales (U.S sample), and UPPS total, urgency and lack of perseverance subscales (German sample). Subsequent analysis revealed that impulsivity and compulsivity (OCI-R) were unique predictors of hoarding, with little difference as to their strength (both samples).

Zermatten and Van der Linden (2008) also used the UPPS in a nonclinical sample with obsessive compulsive symptoms. Analysis revealed no significant correlations between the hoarding subscale of the OCI-R and impulsivity. Hierarchical regression explored whether the UPPS subscales were unique predictors of each OCD symptom domain. Depression scores were entered first, with the four subscales entered second. The results indicated that depression and urgency were significant predictors of hoarding symptoms ($p<.01$ and $p=.01$ respectively). However, the fit of the regression model with impulsivity included was not significant ($p=.06$) and was therefore not improved over that of depression alone.

Self-control measure. Frost et al. (2013) examined self-control in a self-identified hoarding sample. Analysis showed that self-control (BSCS) correlated with severity of hoarding symptoms as measured by the SI-R total ($r=-.35$, $p<.001$) and the three subscales ($p<.001$: acquisition $r=-.37$; discarding $r=-.24$; clutter $r=-.28$). Of the total sample, 369 (70%) participants scored above the cut-off for clinically significant hoarding symptoms on the HRS-SR. When this sample was compared dependent on their acquisition status, analysis indicated that current acquirers reported significantly lower levels of self-control than past or non-acquirers. Self-control did not differ in

the past and non-acquiring groups. This relationship was supported by regression analysis, conducted on the full sample, that revealed self-control was a significant predictor of acquisition (SI-R), but not discarding or clutter. In the model self-control, cognitive failures, depression and OCD symptoms accounted for 28% of the variance.

Hall et al. (2013) explored comorbidity in a community sample scoring above the cut-off for clinically significant levels of hoarding difficulties on the HRS-SR. Latent class analysis using dichotomous study variables (depression, anxiety, ADHD symptoms and OCD) revealed three distinct hoarding groups: depressed (42% of sample), inattentive-depressed (16% of sample) and non-comorbid (42% of sample). Regression analysis revealed that only the depressed (*OR*=.92; *p*<.001) and the depressed-inattentive (*OR*=.88; *p*<.001) groups had lower self-control, as measured by the BSCS. However, comparison to non-clinical population norms revealed lower levels of self-control in the non-comorbid hoarding group ([Cohen's] *d*=.35, *p*<.001). Of note, it is not clear where the BSCS population norms were obtained from as the authors do not provide references.

O'Sullivan et al. (2010) investigated hoarding symptoms in a clinical sample of participants diagnosed with Parkinson's disease. All participants were divided into one of two groups depending on whether their scores on the SI-R were above or below a clinical cut-off value of 41; named excessive and low hoarding group respectively. Comparison revealed a significant difference between the two groups, with the excessive hoarding group reporting lower levels of self-control (BSCS) than the low hoarding group ([Cohen's] *d*=1.08, *p*<.01). Subsequent correlational analysis using the two

samples combined revealed results similar to that reported by Frost et al. (2013). Specifically, self-control was negatively correlated with SI-R total score (*r*=-.46), and the acquisition (*r*=-.46), difficulty discarding *(r*=-.31) and clutter (*r*=-.47) subscales. All correlations were significant at the *p*=.01 level.

Timpano & Schmidt (2010) reported the effect of a self-control training program using two case studies. Participant A presented with hoarding symptoms in the subclinical/clinical range. In contrast, participant B's hoarding symptoms were within the clinical range. Scores on the SCS were below population norms for both participants. Measurement pre (baseline) and post training program allowed for comparison between the two time points with mixed results reported across the two case studies. Specifically, post training participant A showed an increase in self-control (SCS) and a reduction in hoarding symptoms (SI-R), hoarding cognitions (SCI), and clinician assessed clutter (Clutter Image Rating [CIR]; Frost, Steketee, Tolin, & Ranaud, 2008), but only discarded one more item during a behavioural discarding task compared to baseline. Conversely, participant B showed little positive change in self-control, hoarding symptoms, hoarding cognitions and clutter, but discarded nearly 50% more items during the second discarding task. Errors in the results prevent the reporting of exact change scores.

Timpano & Schmidt (2013) investigated hoarding and self-control (BSCS) in three studies. In a university sample (study 1) self-control was correlated with SI-R total and the three subscales (range *r*=-.34 to *r*=-.48, *p*<.001). Regression analysis also revealed that lower self-control was a significant and unique predictor of hoarding severity when all other study variables were controlled for. Study two reported lower self-control in a

hoarding group (p<.01) compared to three separate diagnostic groups ([Cohen's] OCD d=.80; seasonal affective disorder d=.75 and generalised anxiety disorder d=.91). Self-control did not differ between the three comparison groups. This relationship was maintained when the remaining variables were controlled for. A significant correlation was also reported in study three when depression and anxiety levels were controlled (r=-.30; p<.01). In addition study three investigated the effect of self-control depletion (e.g. Stroop) on a discard task. After controlling for hoarding severity (SI-R), the depletion group discarded significantly less, saved more and were more likely to wait, which was particularly evident for personal items.

Personality measure. Fullana et al. (2004) investigated personality traits in participants with OCD. A significant correlation (r=.32; p=.03) was found between hoarding, as measured by the Y-BOCS, and the sensitivity to punishment (SP) subscale of the SPSRQ. The SP subscale assesses the construct of harm avoidance and is the opposite of impulsivity (Cross, Copping, & Campbell, 2011). No relationship was evident with the sensitivity to reward subscale. In addition, multiple regression revealed that the SP subscale (R^2 change=.09; p<.05) and the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) construct of psychoticism (β=-.28; R^2 change=.08; p<.05) accounted for 17% of the variance in hoarding. Three (risk taking, impulsiveness, and sensation seeking) of the seven factors in the psychoticism scale tap into the construct of impulsivity.

LaSalle-Ricci et al. (2006) also explored personality traits and hoarding in a clinical sample of participants with OCD. However, in contrast to Fullana et al. (2004) a specific measure of hoarding was employed (SI-R).

LaSalle-Ricci et al. investigated the personality domains proposed in the five factor model (McCrae & Costa, 1999), as assessed by the NEO-PI-R measure. A positive correlation with the impulsivity sub-factor (r=.28; p<.01) from the neuroticism domain was found. However, analysis also revealed a significant correlation with the higher order neuroticism domain in general (r=.30; p<.001), as well as three other sub-factors including anxiety, self-consciousness and vulnerability. A significant negative relationship was also observed between hoarding severity and the higher order conscientiousness domain, which includes two factors related to impulsivity: self-discipline and deliberation. However, no significant correlations were reported for the specific sub-factors of self-discipline or deliberation.

Samuels et al. (2008b) explored gender differences in a clinical sample of participants with a diagnosis of OCD. The hoarding dimension of the Y-BOCS was used to assign participants to two groups, hoarding and non-hoarding; with the NEO-PI-R used to assess personality structure. Multiple regression revealed that the female hoarding group scored significantly lower on the NEO personality sub-factor of self-discipline than the non-hoarding group (Cohen's] d=.77, p<.001). Comparison of personality traits in the male hoarding and non-hoarding groups revealed similar results, with the hoarding group reporting lower self-discipline that the non-hoarding group ([Cohen's] d=.20). However, the difference reported by males in self-discipline was not-significant. Again, no other significant differences were observed in the remaining personality sub-factors related to impulsivity/self-control.

Discussion

This review aimed to synthesise the current literature in relation to hoarding, impulsivity and self-control. It was hoped that this review would provide clarity as to whether impulsive features are present in hoarding, and need greater consideration in formulation and treatment planning.

Overall, the seven studies which employed a specific measure of impulsivity reported contradictory findings. Four studies (Fitch & Cougle, 2013; Hezel & Hooley, 2014; Mueller et al., 2007; Timpano et al., 2013) used the BIS-11, which is the most established multi-dimensional measure of impulsivity (Arce & Santisteban, 2006). The BIS assess attentional (inattention and distractibility), nonplanning (self-control) and motor impulsivity (acting without thought and planning). Higher impulsivity was associated with greater hoarding severity in three of the four (nonclinical) samples assessed (Fitch & Cougle, 2013; Hezel & Hooley, 2014; Timpano et al., 2013). When BIS subscales were reported, a similar pattern was typically observed, particularly for the attentional and motor impulsivity subscales. However, only the subscale of increased acquisition was related to greater impulsivity in a CB sample. The absence of differences in impulsivity in compulsive buyers with/without hoarding led Mueller et al. (2007) to suggest that impulsive features in hoarding are a possible artefact of the relationship between CB and reduced impulse control.

Although Mueller et al. (2007) reported that impulsivity was above the selected cut-off value in their CB sample, Fitch & Cougle (2013) reported that all impulsivity scores in their non-clinical sample were within the average

range. Mueller et al. employed a reduced cut-off score of 60, with a total score greater than 74 recommended in the literature (Matisiewicz, Reynolds, & Lejuez, 2012). Whilst impulsivity scores were above this value in Mueller et al.'s study, a cut-off value of 74 would have indicated impulsivity within the average range in all other comparison groups (Fitch & Cougle, 2013; Hezel & Hooley, 2014; Timpano et al., 2013). This raises doubts as to the possible relationship between hoarding and impulsivity. In addition, the use of different values to determine high/problematic levels of impulsivity present challenges when comparing findings across studies. Nevertheless, impulsivity as measured by the BIS appears to tap into a range of constructs which bear many similarities to possible cognitive deficits. Cognitive deficits such as difficulties related to sustaining attention, planning, categorisation and decision making are considered to play an important role in the maintenance of hoarding difficulties (Steketee & Frost, 2007). Further research is needed in order to clarify whether self-report measures of impulsivity capture a distinct but related characteristic of hoarding (Timpano et al., 2013).

The remaining studies (Rasmussen et al., 2013; Timpano et al., 2013; Zermatten & Van der Linden, 2008) employed the UPPS impulsivity measure which was developed using factor analysis of previous self-report impulsivity measures and the five-factor model of personality (Whiteside & Lynam, 2001). Findings were inconsistent as to the relationship between hoarding symptoms and impulsivity. The urgency subscale showed a somewhat more consistent relationship with hoarding than the other three subscales. Reduced impulse control in the face of strong emotions appears consistent with the subjective experience of many individuals with hoarding difficulties,

who report intense emotions such as powerless when faced with reduced acquiring behaviours (Timpano & Schmidt, 2010). Greater difficulties with perseverance (capacity to remain focused) also appears to share many similarities with the attention subscale of the BIS. Unfortunately, no studies investigating impulsivity/self-control in hoarding samples have utilised multiple self-report measures preventing any direct comparisons being made.

Reduced self-control, as assessed by the BSCS, was consistently associated with greater hoarding difficulties (Frost et al., 2013; Hall et al., 2013; O'Sullivan et al., 2010; Timpano & Schmidt, 2010; 2013). This pattern was evident across the differing sample populations, although was less evident in Timpano & Schmidt's (2010) two case studies. Again, reduced self-control in those with acquisition difficulties was reported (Frost et al., 2013), providing further support for a possible link between impulsivity, acquisition and compulsive buying (Mueller et al., 2007).

Positively, the three studies employing experimental designs reported the effect of self-control on hoarding behaviours from opposing positions; increasing and depleting self-control resources. Although, conclusions cannot be drawn from such a limited number of studies, the results appear to support the resource model of self-control (Baumeister, 2002). This model proposes that resources can be strengthened by practice, and are depleted by engaging in tasks that require a level of self-control (Baumeister, 2002; Baumeister et al., 2006). The process of making decisions, which require self-control, is a source of depletion (Vohs et al., 2004) which appears to be particularly relevant to the treatment of hoarding.

Interestingly, despite reduced self-control showing a largely consistent relationship with hoarding symptoms this was not mirrored by the non-planning subscale of the BIS, which is also reported to tap into the construct of self-control (Arce & Santisteban, 2006). Similarly, little consistency was evident on the personality measures (NEO; SPSRQ) with greater harm avoidance, greater impulsivity and lower self-discipline reported in those with hoarding difficulties across the two measures. Although self-report measures of impulsivity/self-control demonstrate greater convergent validity than neuropsychological tests of cognitive function (Duckworth & Kern, 2011), inconsistency of findings arising from both the same and disparate self-report assessment tools is consistent with Woody et al.'s (2014) review of the HD literature and response inhibition. Findings from the current review therefore support Woody et al.'s assertion that more extensive research into impulsivity is warranted before any definitive conclusion can be made.

Methodological limitations

A key limitation of the studies reviewed was the methodological designs employed. Cross-sectional designs prevented any conclusions being drawn as to the cause and effect of relationships identified. Although three studies were of an experimental design, two (Timpano & Schmidt, 2010) reported findings from a sample size of N=1. Generalisability of such results is therefore limited. Additionally, the majority of studies reviewed were not focused specifically on the topic of impulsivity and self-control in hoarding. As a result studies only included one self-report measure of interest, with not all variables, subscales or group comparisons reported. As stated previously, this prevented a thorough examination of possible relationships between the

different subscales and consideration of similarities in the differing constructs of impulsivity and self-control assessed.

Positively, the majority of studies employed a validated and hoarding specific (e.g. SI-R; HRS-SR) self-report measure and identified cut-off values to assess clinically significant hoarding difficulties. No study employed the Structured Interview for HD (SIHD; Nordsletten et al., 2013) although five studies identified hoarding difficulties through diagnostic/clinical interviews (SCID, ADIS, HRS-I). As is common in the study of hoarding, the average age of non-clinical and self-identified groups tended to be lower than what is typically observed in clinical treatment settings (Rasmussen et al., 2013). This presents some challenges given that hoarding symptoms do not tend to reach clinical levels until late adulthood (Grisham et al., 2006). Furthermore, at present hoarding difficulties appear to be investigated by a small number of researchers, leading to the same individuals appearing as authors on multiple papers, with the majority of studies originating from the United States. Although research into hoarding has increased in recent years, such a small evidence base by an even smaller number of contributors has the potential to increase bias.

Clinical implications

Greater impulsivity and reduced self-control is consistently linked with greater symptom severity, reduced treatment compliance and lower recovery rates (Morean et al., 2014). This is likely to be also true for those with HD; with impulsivity and low self-control possibly interacting to reduce an individual’s capacity to override their impulses to acquire and save objects

and preventing them from remaining on therapeutic tasks such as discarding exposure (Timpano & Schmidt, 2010). Conversely, it has been suggested that greater harm avoidance and reduced reward seeking behaviour may reduce an individual's capacity to engage in treatment, which requires them to take a 'risk' by discarding objects and experience the accompanying negative emotions (e.g. loss, grief; Fullana et al., 2004; Rasmussen et al., 2013). Evidence supporting the idea of self-control depletion following tasks which require an individual's resources to be exerted, including that of making choices (Baumeister, 2002; Timpano & Schmidt, 2013; Vohs et al., 2004), may also need to be taken into account when developing treatment programs for hoarding, where the primary goal is often to make frequent decisions regarding multiple items to discard.

Current conceptualisations of hoarding do not refer to the possible role of impulsivity and reduced self-control (Timpano et al., 2013). Consequently, impulsivity and self-control are not explicitly factored into current treatment models. Theoretical and associated treatment models that attempt to incorporate the full spectrum of impulsive and compulsive behaviours therefore need testing (Timpano et al., 2013).

Future research considerations

Whilst it is positive that research into HD is growing, more research is needed. The hoarding literature would benefit from research using clinical samples that satisfy DSM-5 diagnostic criteria and larger sample sizes. More research is also needed to understand the interaction of possible confounding variables such as age and comorbidity.

Unfortunately, despite numerous attempts to define both impulsivity and self-control little consensus exists (Arce & Santisteban, 2006; Rasmussen et al., 2013). Future research would therefore benefit from including multiple measures of impulsivity and/or self-control thereby allowing a more in depth comparison to take place. This would be particularly helpful for studies employing self-report measures of impulsivity and self-control as this area has received less attention, particularly within hoarding research. Currently the lack of available studies reporting multiple measures of impulsivity/self-control in the same samples prevents direct comparisons between the constructs contained within each measure. Additionally, further research into the benefits of self-control training, based on the resource model, is recommended (Timpano & Schmidt, 2010).

Conclusion

In conclusion, there is a paucity of high quality research exploring the relationship between impulsivity and/or self-control and hoarding. This precludes any definitive conclusions being drawn as to whether deficits in impulse control contribute to characteristic problems of acquisition, discard and clutter. The inconsistent results found suggests an area worth investigating further. Future studies are recommended to incorporate multiple measures of impulsivity/self-control to allow for greater comparison between differing concepts of impulsivity, as measured by both self-report measures and neurocognitive experimental designs.

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Note. * Asterisk denotes studies included for review.

Appendix A: Study quality checklist

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Novel items:

	Yes	No	Unclear	N/A
*6. Hoarding identified via ** *1. Clinical interview (3pt)* *2. Hoarding specific measure (self-report) with/without the use of clinical cut-off scores (2pt)* *3. Other: OCD measure(1pt)*				
7. DSM co-morbidity assessed via clinical interview				
8. More than one (self-report) measure of impulsivity and/or self-control?				

* *adjusted* Maximum available =10

** *Highest score only*

Appendix B: Summary of paper quality scores

Author(s) & date	Question number								Quality score
	1	2	3	4	5	6	7	8	
Fitch & Cougle (2013)	N/A	1	1	1	1	3	0	0	7/9 (78%)
Frost et al. (2013)	N/A	1	1	1	1	2	0	0	6/9 (67%)
Fullana et al. (2004)	N/A	0	1	N/A	1	1	1	0	4/8 (50%)
Hall et al. (2013)	N/A	1	1	0	1	2	0	0	5/9 (56%)
Hezel & Hooley (2014)	N/A	1	1	1	1	2	0	0	6/9 (67%)
LaSalle-Ricci et al. (2006)	N/A	1	1	N/A	1	2	1	0	6/8 (75%)
Mueller et al. (2007)	N/A	1	0	1	1	2	1	0	6/9 (67%)
O'Sullivan et al. (2010)	N/A	1	1	1	1	2	0	0	6/9 (67%)
Rasmussen et al. (2013)	N/A	1	1	1	1	3	1	0	8/9 (89%)
Samuels et al. (2008b)	N/A	1	0	1	1	1	1	0	5/9 (56%)
Timpano et al. (2013)	N/A	1	1	1	1	2	0	1	7/9 (78%)
Timpano & Schmidt (2010)	N/A	1	1	N/A	0	3	1	0	6/8 (75%)[1]
Timpano & Schmidt (2013)	1	1	1	1	1	3	1	0	9/10 (90%)
Zermatten & Van der Linden (2008)	N/A	0	0	N/A	1	1	0	0	2/8 (25%)

[1] Errors in reported results

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Section Two: Research Report

Can cognitive analytic therapy (CAT) treat chronic and complex hoarding? A hermeneutic single case efficacy design (HSCED) evaluation.

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Abstract

Objectives. The evidence base for the treatment of Hoarding Disorder (HD) is overly focused on cognitive behavioural therapy and there is a need to research alternative models. An adjudicated hermeneutic single case efficacy design (HSCED) was conducted to explore the efficacy of cognitive analytic therapy (CAT) for HD.

Methods. Quantitative and qualitative outcome data was analysed and combined to form a rich case record. Arguments for and against the efficacy of CAT were identified by two separate research teams (*n*=3) and presented to independent judges (*N*=3) for deliberation and delivery of a final verdict.

Results. Contradictions were present in the quantitative and qualitative outcome data, with measures indicating the presence and absence of change. Subsequently, all three judges returned a verdict in favour of the skeptic position, concluding that CAT was not efficacious in bringing about change. Judges identified the primary goal of reducing hoarding severity with outcomes on validated measures of hoarding particularly influential in the judgement process.

Conclusions. The adjudicated HSCED indicated that CAT was not efficacious in treating HD. However, more research is needed before any conclusions can be made as to the wider efficacy of CAT for HD. Viability of adjudicated HSCED as a complementary method to more traditional treatment efficacy designs is supported.

Introduction

Persistent difficulties discarding possessions to the point where living spaces are cluttered and no longer able to function as designed is a defining characteristic of Hoarding Disorder (HD). To distinguish HD from other forms of collecting behaviour DSM-5 (American Psychiatric Association [APA], 2013) emphasises subjective experience of distress when faced with discard and significant levels of distress and functional impairment as a result of hoarding (APA, 2013). Excessive acquisition (Frost, Rosenfield, Steketee, & Tolin, 2013) and poor insight (APA, 2013) are also characteristic of HD.

The most common framework for conceptualising HD is the cognitive behavioural model (Frost & Hartl, 1996; Steketee & Frost, 2007). This framework proposes that hoarding develops and is maintained by interactions between early vulnerabilities (e.g. childhood experiences, personality traits, cognitive deficits), maladaptive and erroneous beliefs about possessions (e.g. regarding value, responsibilities, aesthetics), disproportionate emotional attachments to possessions, and the subjective experience of positive and negative emotions in response to hoarding behaviours. Consistent with this framework, the cognitive behavioural therapy (CBT) treatment model targets hoarding behaviours by decreasing clutter and acquisition and increasing discard, and addressing the maladaptive cognitions and emotions which play a significant maintaining role (Steketee & Frost, 2007).

Despite the small sample sizes typically employed (e.g. N=1 to N=41) improvement using the CBT model is consistent across differing populations

and treatment contexts including individual therapy (Ayers, Wetherell, Golshan, & Saxena, 2011; Frost, Steketee, & Greene, 2003; Hartl & Frost, 1999; Kellett, 2006; Pollock, Kellett, & Totterdell, 2013; Steketee, Frost, Tolin, Rasmussen, & Brown, 2010; Steketee, Frost, Wincze, Greene, & Douglass, 2000; Tolin, Frost, & Steketee, 2007; Turner, Steketee, & Nauth, 2010); group based therapy (Gilliam et al., 2011; Muroff et al., 2009; Muroff, Steketee, Bratiotis, & Ross, 2012; Steketee et al., 2000), and non-professional or self-help (Frost, Pekareve-Kochergina, & Maxner, 2011; Frost, Ruby, & Shuer, 2012; Muroff, Steketee, Himle, & Frost, 2010). The recent meta-analysis (Tolin, Frost, Steketee, & Muroff, 2015) of 10 outcome studies covering 12 samples revealed significant decreases in symptom severity ([hedges] *g*=.82). A larger effect size ([hedges] *g*=.89) for reduced problems with discard was found in comparison to clutter ([hedges] *g*=.70) and acquisition ([hedges] *g*=.72). Despite these significant reductions in symptom severity, the majority did not satisfy criteria for clinically significant change (64.62%), with participants continuing to present within the clinical range at the end of treatment.

Treatment studies have identified many challenges of treating those with hoarding difficulties, including fluctuating levels of motivation, the ego-syntonic nature of symptoms (Muroff et al., 2009; Timpano & Schmidt, 2013), high rates of attrition, and poor homework compliance including resistance to discard (Steketee et al., 2000; 2010; Tolin et al., 2007). Such findings suggest that for many with hoarding difficulties alternative treatments to CBT are indicated and is consistent with offering patients choice. Unfortunately, there is a dearth of literature relating to the treatment of hoarding with

alternative psychological models (Pollock et al., 2013). It is unclear how to treat an individual presenting with hoarding difficulties who has previously engaged in CBT with limited effect for example. More research into alternative models of treatment is clearly warranted (Pollock et al., 2013).

A model which has shown promise across a range of psychological disorders is cognitive analytic therapy (CAT). In their review of the CAT outcome literature (*N*=25) Calvert and Kellett (2014) concluded that there was preliminary evidence to support the efficacy of CAT in treating personality disorders, common mental health problems (e.g. anxiety and depression), eating disorders and childhood sexual abuse. Ryle, Kellett, Hepple, and Calvert (2014) also reported a large pan ([Cohen's] *d*=.83) diagnostic effect size and encouraged the application of CAT in the treatment of other disorders. However, the current evidence base for CAT is small, particularly in comparison to more established therapeutic models, and consists largely of small scale but high quality practice based studies. The lack of available studies precludes any definitive conclusions as to the true efficacy of CAT with Calvert and Kellett (2014) suggesting that further outcome research is required.

Currently no studies have investigated the viability of CAT in the treatment of hoarding. CAT as opposed to CBT would take a more relational view of hoarding and testing of an alternative (analytically informed) treatment model is warranted. In addition, the evidence base for CAT comprises largely of studies conducted with clients with complex and challenging presentations (Calvert & Kellett, 2014; Ryle et al., 2014) indicating its suitability in the treatment of HD.

Single case experimental designs

Randomised control trials (RCT) are the most stringent of research designs. However, their focus on controlling confounding variables and generalising across individuals, contexts and treatment settings ignores the idiosyncratic nature of patients and therapy. Consequently, RCT's offer little in terms of understanding the process of change (Bohart, Tallman, Byock, & Mackrill, 2011; Elliott, 2002). Failure of trials to represent the range of clients presenting for treatment or to deliver interventions offered in routine clinical practice are frustrations for clinicians (Barker, Pistrang, & Elliott, 2002). For these reasons, single case experimental designs (SCED) have been proposed as a viable supplementary methodology (Barker et al., 2002). Conducted on one or a small number of participants, repeated and intense measurement enables in-depth comparison, identification of change processes and conclusions regarding treatment effectiveness to be drawn (Barker et al., 2002). Financial viability, ability to incorporate comorbidity/complexity, and lower participant numbers (Barker et al., 2002), means that SCED's are well suited to exploring novel treatment approaches or when the evidence base is thin (Elliott et al., 2009).

The hermeneutic single case efficacy design (HSCED) was developed by Elliott (2002) in an attempt to provide a rigorous protocol for examining efficacy of treatment within single case or small *n* designs. Adjudicated HSCED (Elliott et al., 2009) borrows from the judicial framework for exploring, evaluating and reaching a conclusion derived from contradictory evidence; thereby allowing a decision to be made as to whether change occurred and what factors contributed to change within single therapy cases. Adjudicated

HSCED has defined stages of the development of a rich case record relating to a client's treatment, critical review of the available evidence, development of opposing briefs (skeptic and affirmative), and a final judging panel (Elliott, 2002; Elliott et al., 2009). This critical and reflective process enables conclusions regarding treatment efficacy, based on (1) the presence of evidence supporting the claim that change occurred as a result of the therapy alone and, (2) discounting of alternative non-therapy explanations of change (Elliott, 2002).

There has been a gradual increase in HSCED use with published (Elliott et al., 2009; MacLeod, Elliott, & Rodgers, 2012; Stephen, Elliott, & MacLeod, 2011; Widdowson, 2012a; 2012b) and unpublished (Curling, 2013; Kuhlman, 2013; Pereira, 2014; Widdowson, 2013) studies employing the methodology to explore outcomes of differing treatment modalities. Benelli, De Carlo, Biffi and McLeod (2015) summarised the key characteristics of HSCED's, and based on standards for systematic case study research (McLeod, 2011; 2013) set forth recommendations for its future use. Evidence of increasing acceptability of the adjudicated HSCED methodology also supports its use in evaluating a novel treatment for HD.

Aims

This study aimed to explore the efficacy of cognitive analytic therapy (CAT) in the treatment of HD using an adjudicated HSCED. In accordance with the adjudicated HSCED approach, this study aimed to answer the following:

A. Did the client change over the course of CAT?

B. Was this change due to the effect of CAT?

C. What factors (including mediator and moderators) were responsible for the change?

Ethics

Approval was sought from the relevant NHS ethics committee and research governance office to use retrospective data collected during the clinical treatment of one client (Appendix A and B). Following, informed consent was obtained from the client (Appendix C). All data was anonymised and stored in accordance with the relevant data protection regulations.

Method

Design

An A/B with follow-up SCED with hermeneutic adjudication was employed. Data was categorised into three phases; baseline (A), treatment (B) and follow-up (F/U). Baseline (A) consisted of three assessment sessions over a four week period (*n*=27 days). Treatment (B) consisted of 27 intervention sessions delivered over a 39 week period (*n*=273 days). Follow-up consisted of six sessions spanning a total of six months (*n*=175). All three phases ran consecutively spanning a total of 475 days.

Participant

The client was a 64 year old male with significant chronic hoarding problems. His problems with hoarding commenced following the breakdown of a relationship when aged 35 years. The client lived with his partner. He owned his own home which was severely cluttered, thus preventing any room

from being used. He also hoarded possessions at his partner's house, his allotment and his car. The client exhibited difficulties with discard, including behavioural avoidance due to feelings of anxiety, and reported cognitions consistent with saving behaviour (e.g. thoughts relating to the utility and sentimentality of possessions). He exhibited poor impulse control (e.g. past substance misuse, binge eating) including that of excessive acquisition via purchasing, acquisition of free items and stealing.

The client reported early childhood experiences of emotionally distant caregivers and ineffective boundaries. He learnt from an early age how to manipulate others and developed a sense of entitlement, importance and superiority. He identified a vivid fantasy world in which he felt happy, powerful and excelled, and did not therefore have to entertain the banalities of normal life (e.g. discarding of possessions).

The client had engaged in CBT on two occasions (duration of 20 and six sessions) with BABCP (British Association for Behavioural and Cognitive Psychotherapies) accredited CBT practitioners. Both treatments focused on exposure and response prevention, but were deemed clinically ineffective. The client had previously been prescribed a variety of psychiatric medications, but was not taking any medication during CAT.

Treatment context

Treatment was delivered in the UK in a tertiary outpatient psychotherapy service provided by the National Health Service. The client was referred for CAT following an assessment which concluded that

psychoanalysis was not indicated. He attended one screening session, six months prior to commencing CAT.

Therapist. The therapist was a male Consultant Clinical Psychologist and ACAT (The Association for CAT) accredited practitioner, supervisor and trainer. The therapist was undergoing additional CAT training with weekly supervision provided by a UK Council for Psychotherapy CAT psychotherapist. The client acted as the therapist's training case. The therapist had previous experience of treating hoarding with CBT (Kellett, 2006; Pollock et al., 2013).

Cognitive Analytic Therapy. CAT is a time-limited therapy which integrates methods from other theoretical perspectives e.g. cognitive, analytic and social theory (Ryle & Kerr, 2002). CAT proposes that internalised and repeating relational patterns (reciprocal roles), developed during formative years, are the foundation for problematic and unhelpful ways of coping (affective, cognitive and behavioural). CAT consists of three stages; (1) re-formulation, (2) recognition, and (3) revision (Ryle & Kerr, 2002). Early narrative and diagrammatic formulation identify reciprocal roles and target problem procedures, which become the focus of subsequent sessions. 'Recognition' aims to increase awareness of unhelpful relational patterns, with the client supported to try out alternatives during the latter revision stage. CAT pays explicit attention to the ending of therapy, with goodbye letters exchanged in the final sessions. Follow-up sessions allow for progress to be reviewed. CAT adopts a collaborative approach where therapist and client work together, paying particular attention to the therapeutic relationship, transference/countertransference and re-enactments of

unhelpful patterns. One treatment session was rated on an established measure of Competence in Cognitive Analytic Therapy (CCAT; Bennett & Parry, 2004). The CCAT consists of 10 domains each scored on a 5 point scale: incompetent (0), unsatisfactory (1), satisfactory (2), good (3) and very competent (4). The session was given a total score of 32/40 indicating a 'good' level of competence.

Research context

The researcher was a final year trainee clinical psychologist with an interest in hoarding. Although not affiliated with any psychological model, the researcher has an interest in CAT. It was the researcher's responsibility to conduct the adjudicated HSCED using the data obtained from the retrospective data set. The researcher obtained all relevant approvals and informed consent, completed all analysis of data including initial transcription of both client interviews, compiled the original case record, and developed all briefs, rebuttals and closing summaries. All decisions throughout the life of the study were made by the researcher including data selection/presentation, and selection of the research teams and judges. The therapist acted in the capacity of research supervisor.

Study measures

The client completed measures at specified time points throughout their treatment.

Idiographic. The client completed a daily diary measuring fantasy proneness, acquisition, discard and anxiety levels at morning, afternoon and

evening (Appendix D). The diary was completed throughout the baseline, treatment and follow-up phases (see Table 1).

Acquisition and discard data. Daily acquisition and discard data was used to generate further variables of interest (Pollock et al., 2013):

1. A frequency count of objects acquired each day.
2. Assignment of objects acquired each day to one of three categories: (a) bought; (b) stolen; and (c) free (e.g. obtained from skips).
3. Assignment of objects acquired each day to one of four categories: (a) garden/allotment (e.g. plants); (b) household (e.g. shampoo bottle); (c) information based (e.g. books); and (d) clothes.
4. Estimated volume of objects acquired each day (irrespective of category). Four volume estimates (25% [0.25], 50% [0.50], 75% [0.75] and 100% [1.0] of a 60 gallon rubbish bag) were used. Estimates over this level were obtained by calculating the combined number of bags (e.g. 2.5 bags).
5. Steps 1, 3 and 4 were repeated for objects discarded each day.

Inter-rater reliability analysis was conducted. Three independent raters were provided with 80 days of data (40 acquisition and 40 discard) and completed each stage outlined above. Forty days of data (20 acquisition and 20 discard) was selected randomly, with the remainder purposely selected on the basis that they were difficult to count/categorise. Reliability was high for the majority of variables ($\alpha \geq .80$ [n=3]; $\alpha \geq .9$ [n=11]). Frequency count of garden/allotment objects discarded was poor (α=.40).

Table 1:

Idiographic variables captured by daily diary

Measure	Idiographic wording	Response format	Baseline (*n*)	Treatment (*n*)	Follow-up (*n*)
Measure 1	How hard have I worked on my real problems today †	Rating: 1 to 9 1 (not at all) 9 (all day)	20	221	158
Measure 2	Today, I have acquired?	Free text	20	223	161
Measure 3	Put the letter ‘s’ next to stuff that you have stolen in the list	Free text	20	223	161
Measure 4	Today, I have discarded? †	Free text	20	223	161
Measure 5a	My levels of anxiety today have been: Morning	Rating: 1 to 9 1 (not at all) 5 (somewhat) 9 (very)	20	222	161
Measure 5b	My levels of anxiety today have been: Afternoon	Rating: 1 to 9 1 (not at all) 5 (somewhat) 9 (very)	20	222	161
Measure 5c	My levels of anxiety today have been: Evening	Rating: 1 to 9 1 (not at all) 5 (somewhat) 9 (very)	20	222	161

Note. The exact wording has been retained with scale anchors reported where defined; † direction of change is reversed with higher values indicative of improvement.

Nomothetic. Four nomothetic measures were completed at three time points; assessment, end of treatment and end of follow-up.

Beck Depression Inventory (BDI; Beck, Steer, & Brown, 1996). The BDI is a self-report measure of depression, consisting of 21 items scored on a four point scale (0 to 3). Higher scores reflect greater severity with defined cut-offs operationalising minimal (<13), mild (14–19), moderate (20–28), and severe (>29) levels of depression. The BDI has good internal consistency, convergent validity and test-retest reliability (Beck et al., 1996).

Brief Symptom Inventory (BSI; Derogatis, 1993). The BSI is a self-report measure in which 53 items are scored on a five point scale (0 to 4) with higher scores reflecting greater psychological distress. The BSI provides nine symptom dimensions and three distress scales. Only the Global Severity Index (GSI) is reported in the current study. The BSI has good convergent validity and test-retest reliability (Derogatis, 1993).

Savings Inventory–Revised (SI-R; Frost, Steketee, & Grisham, 2004). The SI-R is a self-report measure consisting of 23 items assessing the three main features of hoarding; difficulty discarding, acquiring and clutter. Items are scored on a five point scale (0 to 4) with a total score greater than 41 indicating clinical levels of hoarding (Frost & Hristova, 2011). The SI-R has strong psychometric properties with good internal consistency, test-retest ability, and convergent and discriminate ability (Frost et al., 2004).

Clutter Image Rating (CIR; Frost, Steketee, Tolin, & Renaud, 2008). The CIR is a pictorial assessment measuring the level of clutter in a room. Three rooms are depicted (kitchen, living room and bedroom) with a

clinical cut-off score of four or more. Three independent raters provided an overall clutter rating for each room based on photographs ($n_{baseline}=12$; $n_{follow\text{-}up}=12$) of the client's home. A technical error led to the loss of all photographs for end of treatment. Raters remained blind to study phase, with order of presentation (study phase and room) adjusted for each rater. Mean scores for each room are reported.

Session Impact Scale (SIS; Elliott & Wexler, 1994). The SIS is a self-report measure assessing helpful and hindering aspects of therapy. Items (N=17) are scored on a five point scale (1 to 5) with the helpful scale breaking down into two subscales (relationship and task). The SIS has shown good internal reliability and convergent validity (Elliott & Wexler, 1994). The SIS was completed at the end of each session (Appendix E).

The Change Interview (CI; **Network for Research on Experiential Psychotherapies [NREP], 2003).** The CI is a semi-structured interview assessing the client's perspective as to any changes that have occurred (or not) and possible contributory factors. Changes are rated with regards to expectancy, likelihood and importance. The CI was conducted at the end of treatment and follow-up by an independent third party (Appendix F).

Analysis strategy

Idiographic. Data is depicted in graphical form with each phase of CAT clearly demarcated. Baseline median and phase trendlines facilitate visual comparison between phases. Treatment effect was assessed using analysis of covariance (ANCOVA). All acquisition and discard variables were not normally distributed showing a positive skew. Although a square-root

transformation reduced the level of skew, distributions continued to deviate from normality. ANCOVA however is robust regarding violations of the normality assumption (Glass, Peckham, & Sanders, 1972). Missing data was removed. Serial dependency and non-independence was overcome by creating a lagged variable that demonstrated the strongest correlation to each variable (Chatfield, 2003). Partial autocorrelations (PACF) indicated that a first-order lag was appropriate (see Figure 1 demonstrating the PACF for evening levels of anxiety). Autocorrelation of residuals confirmed that this decision was appropriate. The lagged variable was entered as a covariate in each ANCOVA. Planned contrasts compared study phases. To control for multiple comparisons significant effects were reported at a reduced *p* value ≤.01. Magnitude of effect sizes was confirmed using the non-regressive method percentage exceeding the median (PEM; Parker, Vannest, & Davis, 2011). A logistic regression explored whether study phase predicted incidence of discard. Daily discard occurrence was dichotomized (did/did not) to create the dependent variable.

Nomothetic. Change in nomothetic measures were evaluated using reliable and clinically significant change indices. Reliable change indicates that change is not attributable to chance/measurement error and was calculated using the formula outlined by Jacobson and Truax (1991). Clinically significant change indicates when a patient is no longer within a clinical range (Evans, Margison, & Barkham, 1998).

SIS and CI. The SIS is depicted in graphical form according to subscales (helpful/hindering, task/relationship). Baseline and treatment was compared using independent T-test. The CI's were transcribed and

summarised, using the client's own words, without interpretation or analysis. The researcher's reflective log can be viewed on request.

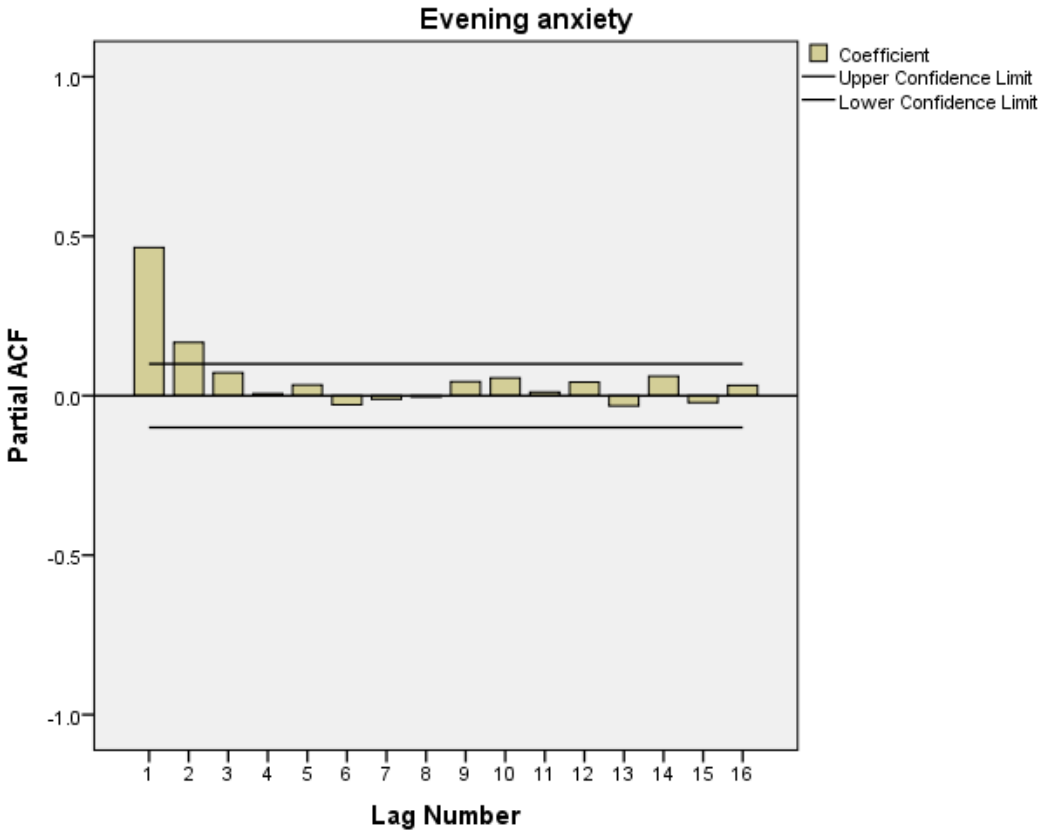


Figure 1

PACF for evening levels of anxiety

Procedure

The adjudicated HSCED consisted of three phases.

Phase 1: Development of case record. The outcome data was analysed as described and combined in the form of a rich case record.

Phase 2: Development of briefs and rebuttals by research teams. Six trainee clinical psychologists acted as members of the affirmative (AT, *n*=3) and skeptic research teams (ST, *n*=3). Members met the following

criteria: (1) third year of clinical training; (2) successful completion of previous SCED course requirement; (3) skills in critically evaluating outcomes, and (4) knowledge of a variety of therapeutic models. Members were randomly assigned into the AT or ST and were provided with the case record one week prior to the first meeting. Each team met separately to identify evidence in accordance with their position (affirmative or skeptic). Each team met a second time to review the opposing evidence and provide a counterargument. The researcher was present at all meetings to facilitate discussion and collated evidence into an AT and ST original brief, rebuttal and closing summary.

Phase 3: Judgement. Three independent researchers acted as judges. Judges were experienced researchers used to evaluating outcome research and represented two therapeutic models. Two judges were experts in the field of CBT and hoarding and were also knowledgeable of the HD evidence base (Professor Randy Frost and Professor David Mataix-Cols). One judge was an expert in CAT (Professor Glenys Parry). Judges were provided with the affirmative and skeptic briefs, rebuttals, closing summaries and case record. Order of presentation of the original outcome data was altered for each judge. The therapist's identity was not revealed. Judges were required to review the information and make a decision as to the efficacy of CAT (Appendix G).

Results

Phase 1: Case record

Analysis of the outcome data revealed the following.

Idiographic. Due to the extent of idiographic data available only the primary measures are presented, in the form of time-series graphs. Statistical analysis of all variables will however be reported.

Fantasy proneness. Figure 2 reports time spent out of fantasy illustrating a declining trend during baseline and stasis during treatment. The initiation of follow-up coincided with a large rise in time spent out of fantasy. However, this was not sustained with the trend returning to the baseline median. There was high variability in fantasy proneness across all phases.

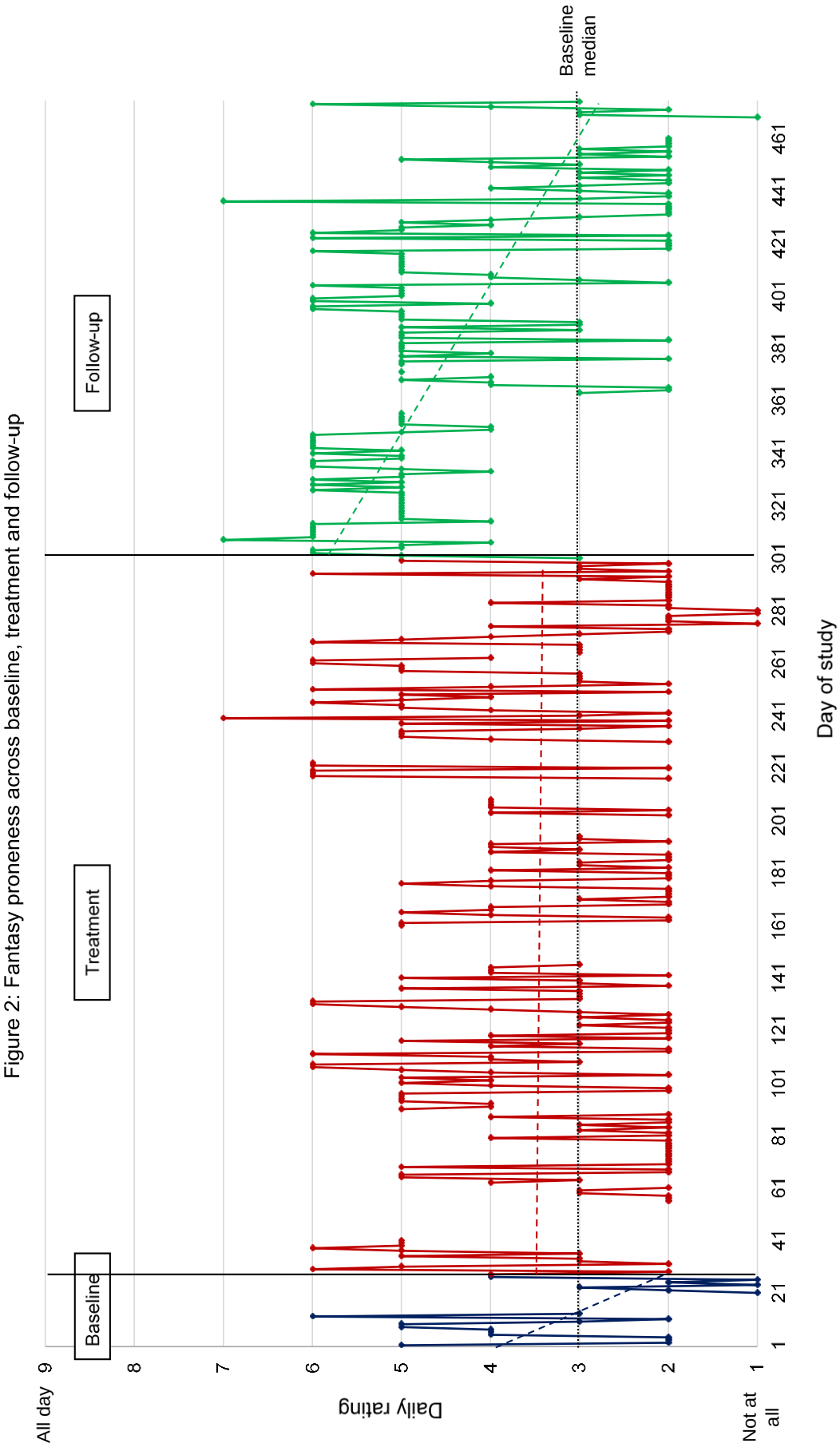
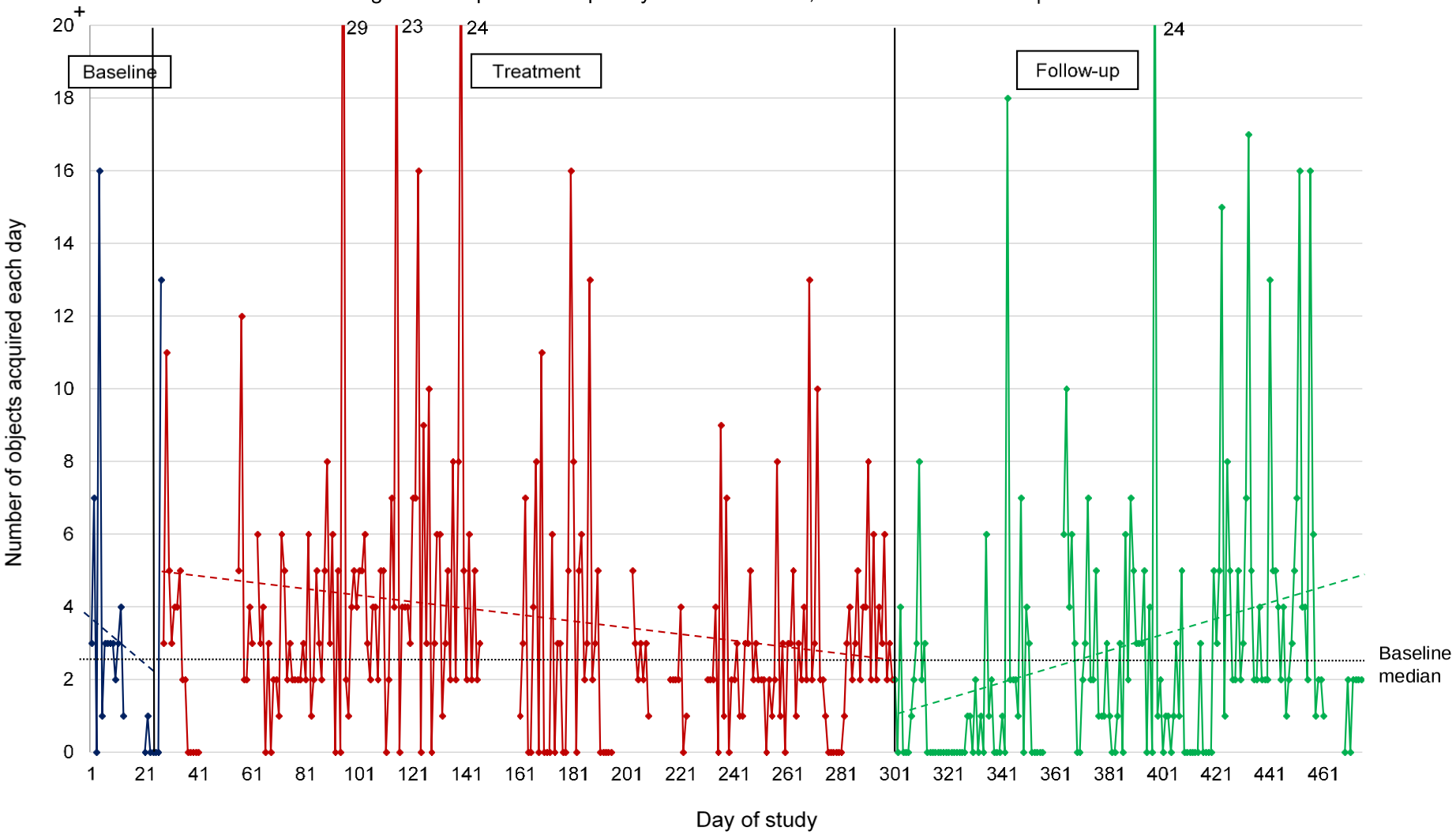


Figure 2: Fantasy proneness across baseline, treatment and follow-up

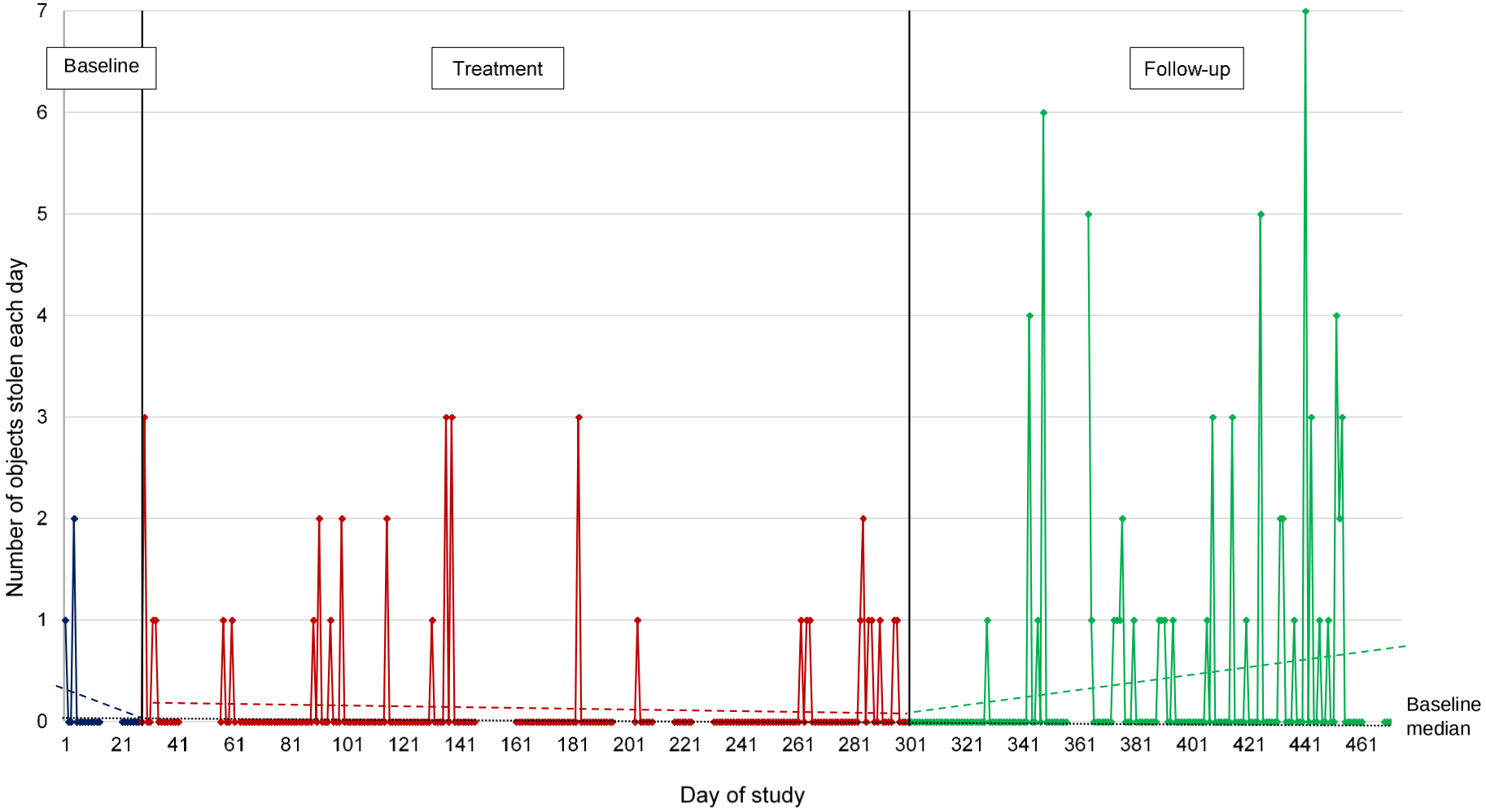
Acquisition. Figure 3 reports acquisition rates. Trendlines indicated a decrease in acquisition during the baseline and treatment phases, although acquisition was frequently above the baseline median. Decrease in rate of acquisition was not sustained, with an upward trend evident across follow-up. Rate of acquisition showed high variability within each phase.

Figure 3: Acquisition frequency across baseline, treatment and follow-up



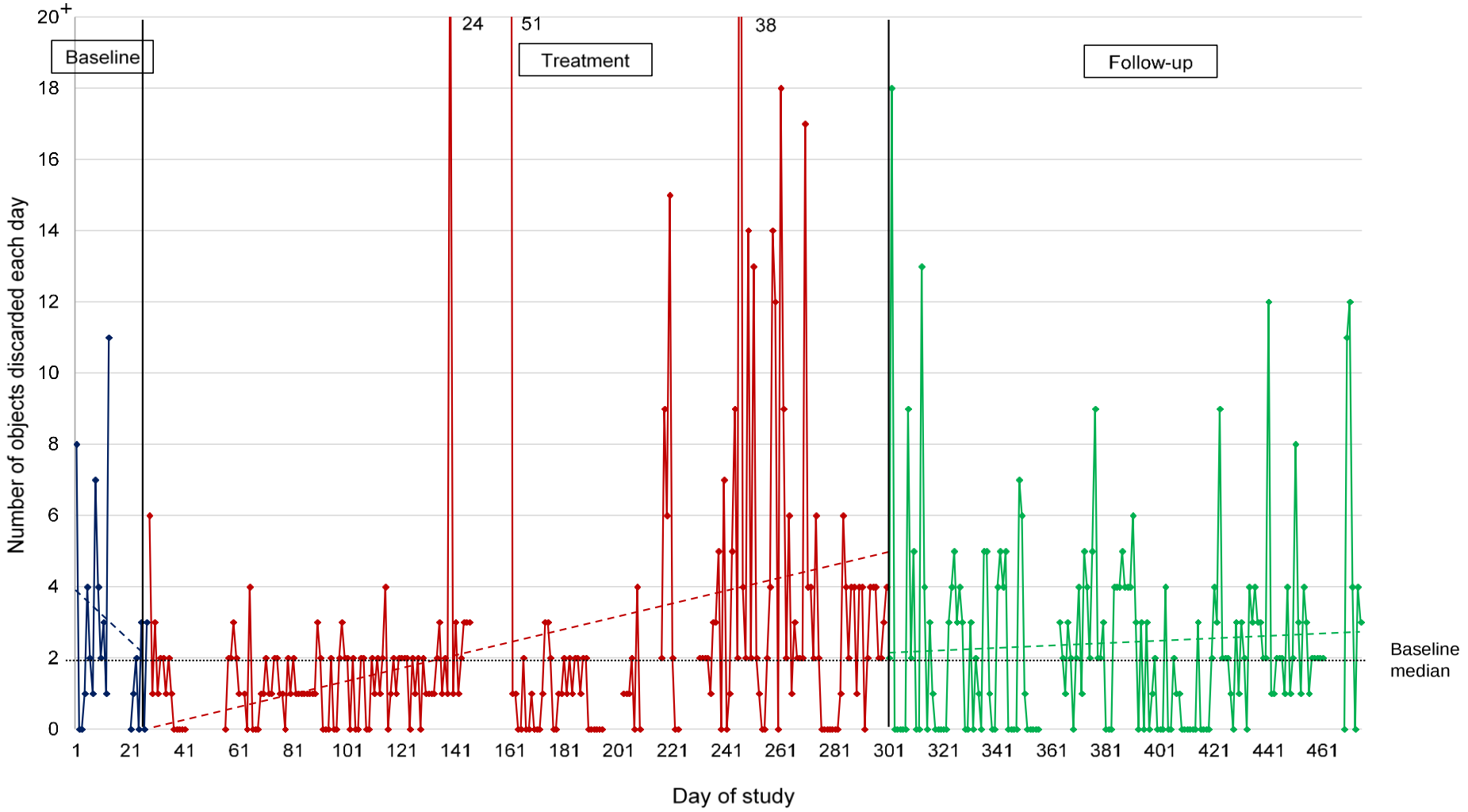
Stealing. Figure 4 illustrates rates of stealing. Stealing behaviour occurred infrequently during baseline and treatment, although an improving trend was just evident in both phases. Stealing occurred more frequently across follow-up, where a deteriorating trend and greater variability in the number of items stolen was evident.

Figure 4: Frequency of stealing across baseline, treatment and follow-up



Discard. Figure 5 illustrates discard rates. Trendlines reveal a decreasing trend during baseline, which was reversed during treatment. Whilst continuing to discard during follow-up, the trendline is not as steep as that evident during treatment. Greater variability in discard rates is evident in the latter half of treatment.

Figure 5: Discard rates across baseline, treatment and follow-up



Anxiety. Figure 6, 7 and 8 depicts morning, afternoon and evening anxiety. All three graphs contain an upward trend during baseline reflecting increasing levels of anxiety. This trend was reversed during treatment, with all three trendlines showing a gradual reduction in anxiety, albeit with slightly different trajectories. Follow-up coincided with a return to increasing levels of anxiety, with upward trends evident.

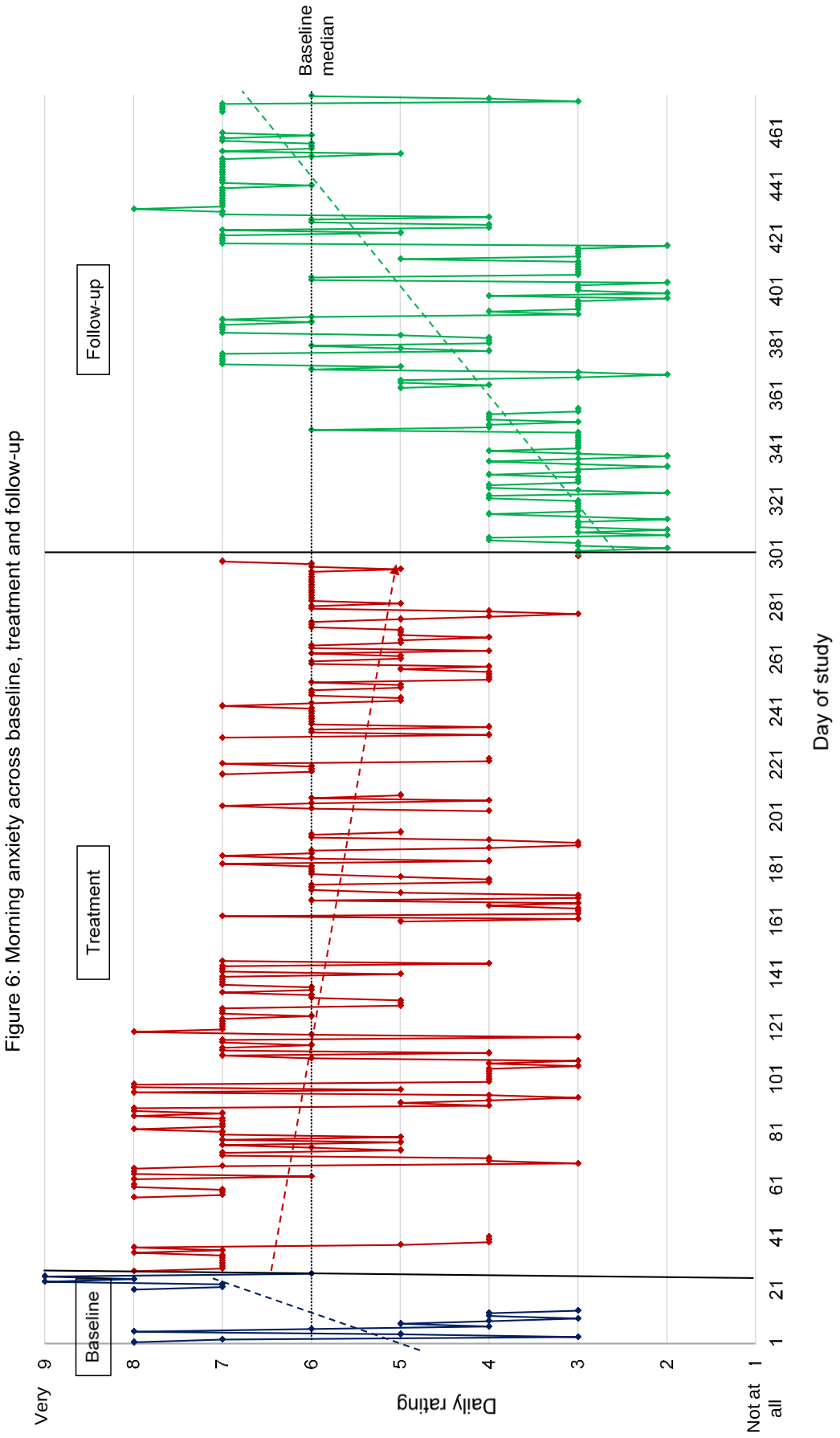


Figure 6: Morning anxiety across baseline, treatment and follow-up

Figure 7: Afternoon anxiety across baseline, treatment and follow-up

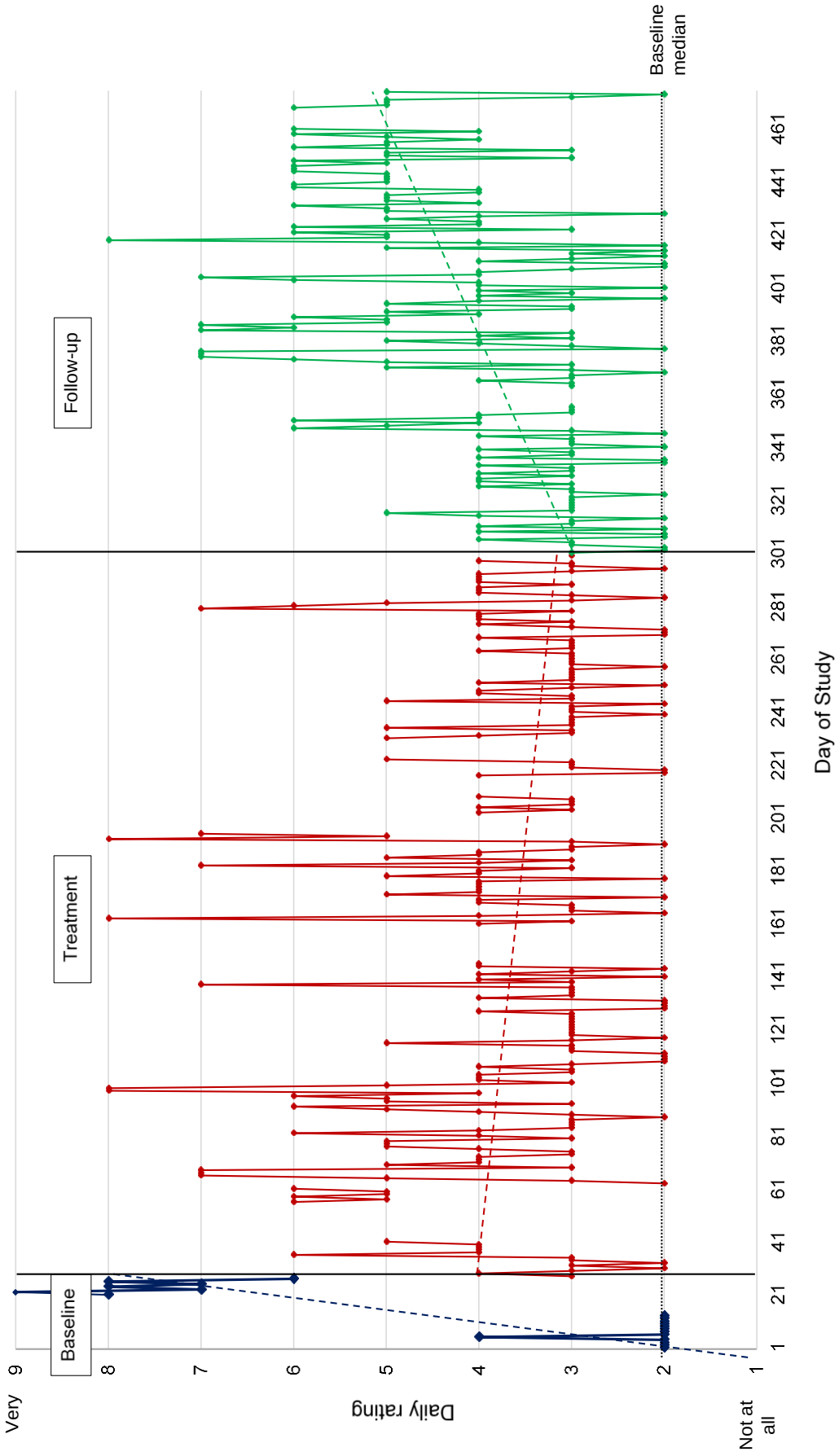


Figure 8: Evening anxiety across baseline, treatment and follow-up

Table 2 contains the ANCOVA results. A significant main effect of study phase was observed for four variables only: fantasy proneness (F(2, 369) = 8.55, p <.01), objects bought (F(2, 381) = 8.41, p <.01), informational objects acquired (F(2, 381) = 9.73, p <.01) and morning anxiety (F(2, 378) = 4.45, p =.01). Planned contrasts revealed a significant reduction between treatment and follow-up for objects bought (t(381) = 4.09, p <.01), informational objects acquired (t(381) = 4.41, p <.01) and morning anxiety (t(378) = 2.96, p <.01) with small effect sizes (partial eta^2) .04, .05, and .02 respectively. A significant increase between treatment and follow-up was found for fantasy proneness (t(369) = 3.98, p <.01), with a small effect size (partial eta^2 = .04). PEM confirmed small treatment effects; fantasy proneness =.7; objects bought =.6, informational objects acquired =.6 and morning anxiety =.6. A binary logistic regression revealed that stage of treatment was not a significant predictor of discard (χ^2 (2, 475) = 3.355, p =.19).

Nomothetic. Table 3 summarises the psychometric outcomes. Scores on the hoarding measures (SI-R and CIR) show little change with values above caseness across baseline, end of treatment and follow-up. The BDI showed a consistent reduction, with reliable and clinically significant reduction in depression achieved by the end of follow-up (final BDI score was within the ‘mild’ range, improving from severe on initial measurement, and below caseness). The BSI-GSI showed a reliable and clinically significant change from baseline to end of treatment. This change was sustained at the end of follow-up. Scores on the BSI met criteria for caseness at all points assessed.

Table 2:

Idiographic variables by baseline, treatment and follow-up

Idiographic variable	Baseline Mean (*SD*)	Treatment Mean (*SD*)	Follow-up Mean (*SD*)	*F* Value	Partial eta²
Fantasy proneness [1]	3.12 (1.45)	3.38 (1.41)	4.36 (1.42)	**8.55** *	.04
Frequency of Acquisition [1]	1.43 (1.23)	1.58 (1.00)	1.22 (1.08)	3.60	.02
Objects stolen [1]	.08 (.34)	.13 (.39)	.25 (.57)	2.83	.02
Objects bought	1.19 (1.24)	1.36 (.89)	.85 (.86)	**8.41** *	.04
Free objects	.36 (.60)	.39 (.75)	.39 (.81)	.01	.00
Acquired – Allotment	.17 (.47)	.20 (.52)	.05 (.28)	4.27	.02
Acquired – Clothes	.14 (.41)	.19 (.43)	.28 (.58)	1.44	.01
Acquired – Household	.70 (1.19)	.66 (.82)	.60 (.85)	.20	.00
Acquired – Information	.87 (.71)	1.13 (.77)	.68 (.79)	**9.73** *	.05
Volume of objects acquired	.37 (.25)	.50 (.32)	.40 (.35)	2.59	.01
Frequency of discard [1]	1.32 (.95)	1.20 (.98)	1.18 (.98)	.14	.00
Discarded – Allotment	.12 (.33)	.09 (.29)	.04 (.26)	1.37	.01
Discarded – Clothes	.41 (.79)	.17 (.57)	.11 (.35)	2.60	.01
Discarded – Household	.96 (.81)	1.00 (.86)	1.06 (.92)	.13	.00
Discarded – Information	.18 (.39)	.09 (.44)	.09 (.40)	.21	.00
Volume of objects discarded	.48 (.33)	.49 (.37)	.39 (.35)	1.62	.01
Morning anxiety [1]	5.59 (2.09)	5.71 (1.38)	4.58 (1.81)	**4.45 ***	.02
Afternoon anxiety [1]	4.18 (2.46)	4.30 (1.11)	4.25 (1.46)	.06	.00
Evening anxiety [1]	3.65 (2.45)	3.66 (1.30)	4.02 (1.40)	1.14	.01

Note. [1] Primary idiographic variables; transformed values reported for all acquisition and discard variables (n=15); unadjusted group means and *SD* reported for all variables; significant *F* values marked in bold; * $p \leq .01$; all values rounded to two decimal places.

Table 3:

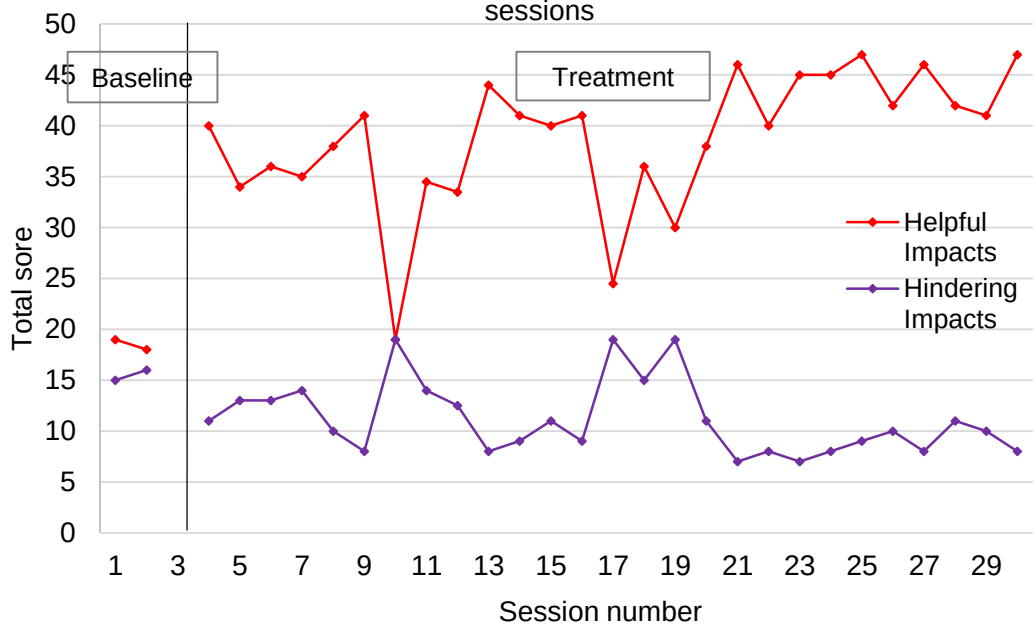
Nomothetic measures by baseline, treatment and follow-up

Measure	Caseness cut-off	Reliable change	Clinically significant change	Clinical sample mean (*SD*)	Non-clinical sample mean (*SD*)	Reliability coefficient	Baseline (T score)	Treatment (T score)	Follow-up (T score)
BDI	17.00	10.41	14.02	20.44 (13.28)	10.04 (8.23)	0.92	**30.00 (severe)**	**20.00** [1] **(moderate)**	14.00 [1 2] (mild)
BSI: Global severity index	63.00	0.61	0.49	1.20 (0.70)	0.25 (0.24)	0.90	**1.84 (80.00)**	**0.75** [1 2] **(66.00)**	**0.75 (66.00)**
SI-R total	41	13.17	43.22	62.00 (12.7)	23.7 (13.2)	0.86	**69.00**	**70.00**	**67.00**
SI-R acquisition	9	7.02	9.92	15.2 (5.4)	6.4 (3.6)	0.78	**21.00**	**21.00**	**22.00**
SI-R clutter	17	5.79	17.89	26.9 (6.6)	8.2 (7.1)	0.90	**24.00**	**24.00**	**23.00**
SI-R discarding	14	4.6	14.5	19.8 (5.0)	9.2 (5.0)	0.89	**24.00**	**25.00**	**22.00**
CIR bedroom	4	1.99		4.34 (2.16)		0.89	**8.67**		**8.67**
CIR kitchen	4	1.85		3.79 (2.01)		0.89	**9**		**8.67**
CIR living room	4	2.06		3.87 (2.24)		0.89	**9**		**8.33**

Note: [1] Reliable change achieved; [2] clinically significant change achieved; items in bold indicate clinical caseness; reliability coefficients based on estimates of internal consistency (BDI and CIR) and test-retest reliability (BSI and SI-R); reliable change calculated using *SD* matched for gender and clinical presentation where possible (i.e. outpatient and/or hoarding sample); clinically significant change calculated using sample matched clinical and non-clinical norms; reliable change and clinically significant change scores rounded to the nearest whole number; BSI caseness represented as a T score; norms taken from Beck et al., 1996 (BDI); Derogatis, 1993 (BSI); Frost et al., 2004 and Tolin, Meunier, Frost, Steketee, 2011 (SI-R); and Frost et al., 2008 (CIR); average scores reported for BSI; CIR nonclinical norms not available so clinically significant change not calculated.

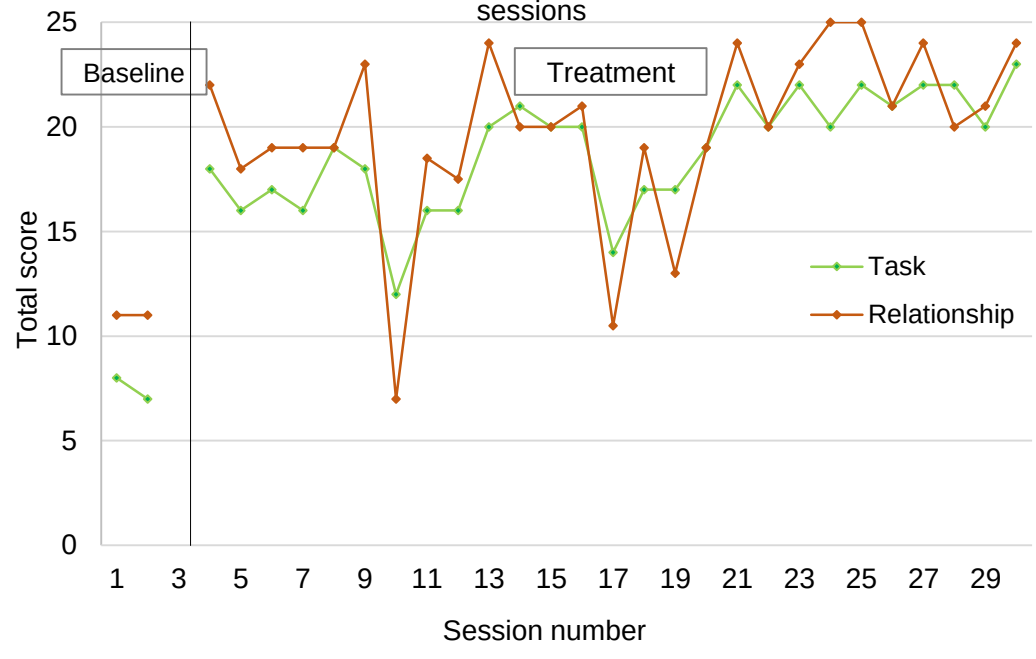
Session impact. Figures 9 and 10 report trends in session impact. Hindering showed an upward trend during baseline, which was reversed during treatment. An opposite pattern is evident regarding helpfulness. The helpful subscales showed an upward trend during treatment compared to a deteriorating (task) and horizontal (relationship) trend during baseline.

Figure 9: Helpful and hindering across baseline and treatment sessions



Note: Maximum score helpful=50, hindering=30

Figure 10: Task and relationship across baseline and treatment sessions



Independent T-test revealed a significant increase between baseline and treatment on the helpful subscale ($t(27) = -4.23$, $p < .01$) and the task ($t(27) = -5.72$, $p < .01$) and relationship subscales ($t(27) = -2.2$, $p < .01$). A non-significant difference was observed on the hindering subscale ($t(27) = 1.67$, $p = .11$).

Change interviews. The client gave a positive account of therapy and reported that therapy had been helpful in eight different ways (see Table 4). A sample of the interview summaries are provided in Appendix H – I. All changes were rated as extremely/very important. Six changes were rated as very unlikely to have occurred without therapy, with two rated somewhat unlikely. Changes were rated as both somewhat expected and a surprise.

Table 4:

Summary of CI change scores

Change	Expectancy	Likelihood	Importance
Started working (before I never did any work) [1]	5	1	5
Able to set my own realistic goals and act on it [1]	2	1	5
I get satisfaction from doing the boring and hard work [1]	4	1	5
Therapy has brought to the forefront my living in a fantasy world [1]	2	1	5
Sense of determination to change things (problems) [2]	2	1	5
Learnt that I live in a fantasy life [2]	4	2	5
Noticed that I have a superior attitude [2]	5	1	5
Leant that people are more important than hobbies [2]	4	2	4

Note: [1] change identified during end of treatment interview; [2] change identified during end of follow-up interview; expectancy rated from 1 to 5 (very much expected, somewhat expected, neither, somewhat surprised, very much surprised); likelihood rated from 1 to 5 (very unlikely, somewhat unlikely, neither, somewhat likely, very likely); importance rated from 1 to 5 (not at all, slightly, moderately, very, extremely).

The client identified his hard work as being integral in bringing about the changes observed, although he described the therapist as a catalyst. The aging process, his father's funeral and attending a driving awareness course were identified as helpful events external to therapy. The client also identified continued difficulties with acquisition and discard and disappointment in the slow rate of progress. Difficult aspects of therapy included feeling exhausted, gaining new knowledge about himself, internalising knowledge and reduced support during the follow-up. No changes for the worse were identified.

Phase 2: Briefs and rebuttals

The primary arguments set forth in the AT and ST briefs, rebuttals and closing summaries are summarised. To review the arguments in full see Appendices J – N.

Affirmative brief. Elliott (2002) identified five types of evidence on which efficacy of therapy is established, with identification of at least two types of evidence stipulated as the threshold for exploring change. The AT identified four types of evidence within their original brief:

Retrospective attribution. The AT presented evidence from the CI where the client repeatedly described therapy as helpful and spoke of change being brought about by his engagement in therapy, where he was "guided along a path" by the therapist. Change scores, in which all changes were rated as unlikely to occur without therapy and were very/extremely important, were identified as further evidence. The AT also proposed that there was acknowledgment of change within the goodbye letters.

Process-outcome mapping. The AT presented evidence from the CI's and goodbye letter to claim that changes were brought about by interventions specific to CAT. Specifically, the client referred directly to the diagrammatic reformulation with this helping him to develop greater insight into his problems. Moreover, the client's reference to learning new skills was linked to the exits stated on the diagrammatic reformulation. The relationship with the therapist and the focus on therapeutic dynamics was also identified as important in facilitating greater insight and change.

Within therapy process-outcome correlation. No evidence identified.

Early change in stable problems. The AT stressed that the client had longstanding difficulties which had proved non-responsive to previous treatments. Statistical evidence of change in the client's general wellbeing (BDI and BSI) and change during treatment on the idiographic measures was presented as evidence of positive change following CAT. In addition the AT stressed the absence of psychiatric medication and questioned the sensitivity of the hoarding specific measures in capturing change. The client's reflections (CI and goodbye letter) was also presented as evidence of change.

Event–shift sequences. The AT proposed that increased insight and recognition of his problems was consistent with the reformulation and recognition phases of CAT, with increased acquisition and discard during the latter part of treatment consistent with the revision stage. In addition, the AT proposed that negative life events (CI) could explain the deterioration

observed during follow-up. Therapist qualifications and competence was presented as evidence of the delivery of CAT.

Skeptic brief. Elliott (2002) identified eight types of evidence illustrating alternative explanations for change. The ST identified six types of evidence within their original brief.

Trivial or negative change. The ST highlighted the lack of change on the hoarding measures (SI-R and CIR) and pointed out that scores on the BSI and BDI still met criteria for caseness at the end of treatment. Minimal improvement and consistent deterioration on the idiographic measures was also presented as evidence.

The ST proposed that the client's reflections (CI's) demonstrated a recognition of little change. Continued acquisition, difficulties with discard, slow progress and explicit acknowledgement of not acting on recommendations was presented as evidence. Furthermore, the ST argued that the client's account of feeling depressed following learning about himself reflected a negative consequence of therapy.

***Statistical* artifacts.** The ST argued that the use of self-report measures was a source of bias leading to socially desirable responding. Discrepancy between the improved BDI score and comments relating to feeling depressed and being offered antidepressants by his GP (CI's) was presented as evidence. The client's description of the diary sheets as tedious was also suggested as a source of measurement error. The ST drew attention to an improving baseline trend on two idiographic measures and the lack of a more complete assessment of therapy competence.

Relational artifacts. The ST argued that the client was susceptible to the influence of social desirability, with reported improvements a reflection of his desire to please. They suggested that the client gave a 'scripted' and overwhelmingly positive account of therapy. Deterioration during follow-up was explained by the reduction in therapist contact. Furthermore, the ST suggested that the client's personality style, of a superior attitude, likely exacerbated any reluctance in acknowledging a lack of change.

Expectancies. The ST argued that the client's 'scripted' account (CI and goodbye letter) reflected internal expectations regarding the process of therapy (e.g. a space to think, talk, learn about himself). Explicit recognition, within the reformulation, of it being the client's last chance and the sudden improvements observed at the end of treatment (idiographic measures) was identified as evidence of the pull to attribute positive change to therapy.

Extra-therapy life events. The ST argued that external life events (e.g. increasing age, father's funeral, and the monetary value of his home) increased the client's level of motivation, with this contributing to change.

Psychobiological factors**.** Indirect evidence relating to the client's visit to the GP and the offer of antidepressants was presented to support the ST position regarding a lack of positive change.

Self-correction processes. No evidence identified.

Reactive effects of research. No evidence identified.

AT rebuttal and closing summary. The AT refuted the claim that change had not occurred. They highlighted the lack of change following previous treatment and argued that change (evident on the BDI, BSI,

idiographic measures and CI's) was deemed meaningful by the client. Sensitivity of the hoarding measures (SI-R and CIR) was again questioned. The suggestion that negative life events resulted in positive change was challenged.

The AT contested the claim of socially desirable responding. They argued that the client gave a realistic account of his progress and highlighted examples of undesirable responding and unhelpful aspects of therapy. It was suggested that negative feelings (e.g. regret) were a natural part of the therapeutic process and that the process of ending may explain the increase in symptoms.

The AT acknowledged the presence of a positive therapeutic relationship, and suggested that CAT pays particular attention to relational processes. Finally, the AT argued that it was unrealistic to expect the client to use technical language in his description of therapy/change. The competency of the therapist was emphasised. In concluding, the AT argued that the client had experienced cognitive and emotional change as a result of CAT. The importance of the therapeutic relationship was acknowledged, again highlighting that relational processes were central to CAT.

ST rebuttal and closing summary. The ST maintained that there was little change observed on the hoarding measures (SI-R and CIR). The ST acknowledged improvement on the BSI and BDI, but argued that the goal of therapy was to treat hoarding. The ST also refuted the presence of change on the idiographic measures, suggesting that change was minimal and not sustained.

The ST reiterated their claim regarding the ‘scripted’ account of therapy and the influence of social desirability. The therapist’s use of the client as a CAT training case was suggested as a source of bias, along with the limited assessment of model adherence. In addition, the ST proposed that the therapeutic relationship, which they highlighted as inherent in all therapeutic models, could explain the client’s positive description of change. Inconsistency between the client’s description of change and scores on the quantitative outcome measures was repeated. Finally, they refuted the AT’s attribution of greater insight to CAT, suggesting that the act of seeking therapy reflected a degree of prior insight. In concluding, the ST proposed that the client did not experience meaningful change as a result of CAT. In addition it was suggested that the client’s account of positive change was an artefact of the therapeutic relationship.

Phase 3: Judgement

Judges responded to each question (Appendix G) posed and provided a brief summary in which they outlined their decisions. Judge’s responses are presented in depth according to each question.

With regards to whether the client changed over the course of CAT, Judge A felt that there was no evidence of change on the primary outcome measures of hoarding, with even the small changes showing a return to baseline at follow-up. Judge A challenged the AT’s criticisms of the hoarding measures. Evidence of significant change in other clients (and on the SI-R and CIR) following CBT for hoarding was presented in support of the ST’s position. Judge B identified that the client showed change on the secondary

measures (BDI and BSI) only. Judge B agreed that there was no evidence of change in the client's hoarding and suggested that a reduction in hoarding symptoms did not reduce as one would expect based on the current evidence base. Judge C also agreed that there was an absence of change on the client's primary problem of hoarding, with the small gains showing a lack of sustainability. However, Judge C felt that although minimal there was evidence of some change. Judge C identified that the client had begun to work on his house, where previously this had been avoided. Additionally, Judge C suggested that the client had moved to a stage of contemplation, showed some assimilation of his difficulties and showed some improvement in mood.

In relation to whether change was due to the effect of therapy, Judge A felt that this question was redundant, due to absence of any change. Judge B felt that was impossible to decipher the cause of any change, but suggested that it was unlikely that change could be attributable to therapy. In contrast, Judge C identified the client's history, unresponsiveness to previous treatments and the client's attribution of the changes as 'surprising', as indicative of change which was probably due to therapy. However, Judge C also suggested that there was little evidence that such changes were the result of CAT techniques/mechanisms specifically.

Therapist contact and number of sessions were identified by Judge B as possible explanations for change. In contrast, Judge C identified that the therapist's formulations, structured practice and identification of the clients core problems may have been central in triggering a process of recognition

and assimilation. Again, Judge A felt that a lack of change made this question redundant.

Table 5 reports the judge's ratings with regards to change. Median scores indicate minimal change (slightly/20%), attributed to therapy at a moderate level (40%). There was variability in level of certainty with median scores of 60% and 80%.

Table 5:

Judges ratings

	Judge A	Judge B	Judge C	Median score
To what extent did the client change?	0%	20%	20%	20%
How certain are you?	100%	80%	40%	80%
To what extent is this due to therapy?	N/A	20%	60%	40%[1]
How certain are you?	100%	60%	40%	60%

Note: No change/0%, slightly/20%, moderately/40%, considerably/60%, substantially/80%, completely/100%; [1] mean score calculated.

In making the final decision, Judge A stressed that the goal of therapy was to reduce hoarding severity. Judge B recognised that the final verdict was based on *N*=1 study. Judge C identified that the evidence presented by the AT did not meet the criteria of 'clear and convincing evidence'. Subsequently, all three judges agreed that the skeptic position gave the most convincing account of change: that meaningful change had not occurred and/or that change was not attributable to CAT.

Discussion

The aim of this study was to explore the efficacy of CAT in the treatment of HD. An adjudicated HSCED was employed allowing for an in-depth and critical review of all available evidence relating to possible change

in the treatment of one client. Following the development of a rich case record (containing quantitative and qualitative outcome data) and affirmative and skeptic arguments, independent judges gave a final decision as to the efficacy of CAT. Final verdicts were required to meet the defined standard of 'clear and convincing evidence' which is set at a probability level of > 80% (Stephen & Elliott, 2011). All three judges returned the same verdict; that the ST presented the best case and as such that CAT was not efficacious in bringing about change.

In considering their verdicts the judges recognised the contradictions present in the evidence (both within and between the qualitative and quantitative outcome data), with evidence both for the presence and absence of change. Adjudicated HSCED are particularly suited to such situations, where the process of developing affirmative and skeptic positions can be used to identify inconsistencies present in the data (Elliott et al., 2009). Reconciliation of such inconsistencies and transparency in how this is achieved provides greater insight into the process of evaluating change and infers confidence in the soundness of any conclusions made (Elliott et al., 2009). In making their final verdicts all three judges identified that the primary goal of therapy was to reduce the client's problems with hoarding. In accordance with this goal, evidence relating to the lack of change on the validated hoarding measures was particularly influential.

Limitations and future research

The *N*=1 nature of this study is a clear limitation. Evidence relating to the efficacy of CAT in the treatment of one client is not sufficient to draw

conclusions as to the efficacy of CAT for HD as a whole (Barker et al., 2002). As such, despite CAT showing little efficacy in this study, further research is needed in order to clarify whether CAT offers any benefits in the treatment of HD. This study does however suggest that the adjudicated HSCED is a suitably stringent research design capable of exploring treatment efficacy in single cases and is therefore able to complement larger more controlled group designs (Benelli et al., 2015; Elliott et al., 2009). Further SCED research would however benefit from employing multiple baseline designs, thereby allowing for greater causal inferences to be made (Barker et al., 2002).

The findings from this study also need to be interpreted in the context of the high level of complexity and possible psychiatric comorbidity seen in the client. Although this is representative of those with HD (Frost, Steketee, & Tolin, 2011; Steketee & Frost, 2007), high psychiatric co-morbidity often has detrimental effects on treatment outcomes (Goddard, Wingrove, & Moran, 2015; Haby, Donnelly, Corry, & Vos, 2006; Steketee, Chambles, & Tran, 2001). The ability of adjudicated HSCED to accommodate comorbidity is however a particular strength of this research design and ensures greater transferability and acceptability of findings to clinical practitioners (Barker et al., 2002; Benelli et al., 2015).

Assessment of one treatment session according to the CCAT (Bennett & Parry, 2004) was a strength as it enabled the study to claim that CAT was delivered to an adequate standard. However, failure to incorporate a more extensive measurement of the delivery of CAT was a weakness, and allowed the ST to challenge the basis for such a claim. In addition, failure to capture

(in greater depth) events which occurred within the therapy room prevented a deeper exploration of the process of change and the impact of specific CAT techniques/mechanisms on bringing about change (Elliott et al., 2009). As such identification of change and contributory factors relied heavily on the client's own account during the CI's. Identification of change and the role of CAT in bringing about such change is therefore likely to have been influenced by the client's own language and description of events. A more objective method of capturing the role of specific CAT mechanisms/techniques would therefore prove helpful in future research.

Future research would also benefit from incorporating more consistent recordings of sessions (Elliott et al., 2009). Measures capturing, in greater detail, helpful aspects of therapy (such as the helpful aspects of therapy [HAT] form; Llewelyn, 1988) and events outside of therapy would be beneficial (Elliott et al., 2009). Session progress notes could provide greater access to important extra-therapy events (Elliott, 2002; Elliott et al., 2009). Alternatively, study measures (e.g. client's daily diary, SIS and HAT) could be adjusted to include questions enquiring about events outside of therapy. The retrospective nature of the current study design is a major limitation which prevented the selection of measures capable of capturing such information and prevented identification of specific types of evidence (e.g. within therapy process-outcome correlation). Ultimately, the ability to detect change and separate out both therapy specific (including CAT specific) and (non-specific) extra-therapy catalysts of change will depend on adequate measurement of relevant variables (e.g. behavioural, cognitive, emotional, process issues, life events; Benelli et al., 2015; Elliott et al., 2009). Future research will need to

balance the challenges of obtaining adequate measurement with that of creating unnecessary and potentially unhelpful amounts of work for both therapist and client.

The therapist's role as research supervisor is a source of potential bias (Elliott et al., 2009). However, the adjudicated HSCED reduces bias directly through the use of research teams and independent judges (Elliott et al., 2009). Potential bias arising from judges preferred theoretical positions is a potential threat to the validity of subsequent conclusions (Benelli et al., 2015). In an attempt to overcome this, a strategy was taken of recruiting judges from two different theoretical models: CAT (the therapy model under investigation) and CBT, for which there is an established evidence base for treating HD. Accordingly, the burden of proof fell on the side of CAT and the affirmative position (Stephen & Elliott, 2011). The process of adjudication and selection of appropriate judges is an area of the HSCED under continued development, with further research needed to clarify the most appropriate selection process (Benelli et al., 2015; Elliott et al., 2009).

Clinical implications

Despite CAT been deemed as non-efficacious in the treatment of HD in this case, such findings cannot be generalised to the treatment of HD per say. Clinical practitioners should continue to base decisions as to the suitability of particular therapeutic models on their clients presenting difficulties, the relevant evidence base and their own clinical judgement (American Psychological Association, 2006).

The hourglass model of clinical research (Salkovskis, 1995) defines that in order to establish the efficacy of a treatment model for HD a process of development is required; whereby models are explored, tested and refined over a series of phases. Early in this process practice-based, uncontrolled and small scale HD outcome research would play a central role in establishing and defining relevant research questions. This then acts as an empirical scaffold to move to more stringently controlled research designs in the second phase (such as RCTs and component analyses). The final stage involves testing the effectiveness of the HD treatment via clinical audit in large-scale practice-based settings once again. The continuing nature of this process leads to further theoretical knowledge which once again informs exploratory research designs (Bateman, 2007). Adjudicated HSCED's such as the one conducted here fit neatly within the initial exploratory stage of the hourglass, offering insight into the possible value of a novel HD treatment model (CAT). Bateman (2007) suggests that although some treatment models have made significant progress in developing an established evidence base (e.g. CBT for HD), others treatment models remain in early developmental stages (i.e. stage 1 of the hourglass). Although the current study indicated that CAT was not efficacious in treating HD there remains a need for further stage 1 testing of CAT. Research concerning other models to CBT also offers the possibility of providing patient choice regarding treatment in the future.

Conclusion

An adjudicated HSCED indicated that CAT (in this single case) was not efficacious in treating complex hoarding. More research is needed before

any conclusions can be made as to the wider efficacy of CAT for HD. Adjudicated HSCED appears to be a valuable research methodology capable of evaluating change within specific and complex therapy cases. The approach is heavily reliant on measures used to capture change, with future research advised to give measure selection greater consideration (Benelli et al., 2015).

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Appendix A: NHS ethical approval

NHS
Health Research Authority
National Research Ethics Service

NRES Committee North West - Greater Manchester West
Barlow House
3rd Floor
4 Minshull Street
Manchester
M1 3DZ

24 March 2015

Miss Claire Spence
Trainee Clinical Psychologist
Sheffield Health and Social Care Trust
Clinical Psychology Unit
Western Bank
Sheffield
S10 2TN

Dear Miss Spence

Study title:	**Can cognitive analytic therapy (CAT) treat hoarding disorder: An adjudicated Hermeneutic Single Case Efficacy evaluation**
REC reference:	**15/NW/0199**
IRAS project ID:	**169621**

Thank you for your submission responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact the REC Manager, Anna Bannister, nrescommittee.northwest-gmwest@nhs.net . Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database. This should be before the first participant is recruited but no later than 6 weeks after recruitment of the first participant.

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from NRES. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS sites

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Covering letter on headed paper [Covering Letter]	1	13 February 2015
Covering letter on headed paper [Covering Letter]	1	19 March 2015

Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Insurance Certificate]	1	11 February 2015
IRAS Checklist XML [Checklist_23022015]		23 February 2015
Letter from sponsor [Scientific Approval Letter]	1	06 February 2015
Letters of invitation to participant [Email invitation for research team members V2]	2	16 December 2014
Letters of invitation to participant [Email invitation to judges V2]	2	16 December 2014
Participant consent form [Client consent form V2]	2	16 December 2014
Participant information sheet (PIS) [Information sheet for client V3]	3	19 March 2015
REC Application Form [REC_Form_23022015]		23 February 2015
Research protocol or project proposal [Research Protocol V2]	2	16 December 2014
Summary CV for Chief Investigator (CI) [CV - CI & Student]	1	11 February 2015
Summary CV for supervisor (student research) [Supervisor CV]		11 February 2015

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

15/NW/0199	Please quote this number on all correspondence

With the Committee's best wishes for the success of this project.

Yours sincerely

pp K. Southgate

On behalf of Dr Lorraine Lighton (Chair)
Chair

Email: nrescommittee.northwest-gmwest@nhs.net

Enclosures: "After ethical review – guidance for researchers"

Copy to: *Dr Andrew Thompson*

Mr Daniel Last, Sheffield Health and Social Care NHS Foundation Trust

Appendix B: R&D approval

Sheffield City Council

Sheffield Health and Social Care NHS

NHS Foundation Trust

Medical Directorate
Research Development Unit
Fulwood House
Old Fulwood Road
Sheffield
S10 3TH

Tel: 0114 2718804
Fax: 0114 2716736

E-mail: rdu@shsc.nhs.uk
www.shsc.nhs.uk

16th April 2015

Miss Claire Spence
Clinical Psychology Unit
University of Sheffield
Western Bank
Sheffield
S10 2TN

Dear Miss Spence

RDU ID: **ZQ09**

Full Project Title: **Can cognitive analytic therapy (CAT) treat hoarding disorder: an adjudicated hermeneutic single case efficacy evaluation**

REC No: **15/NW/0199**

I can confirm on behalf of Sheffield Health and Social Care NHS Foundation Trust that you now have **NHS Permission to start research within that Trust.**

We also advise you of the following conditions and guidance:

1. **We are required to report on and request that you notify us of the following (as soon as they are available);**
   - **The actual start date of the study and an estimated end date**
   - **The date of the first participant's first visit**
   - **The date of the last participant's first visit**
   - **The date of the last participant's last visit**
   - **The actual end date of the study**
2. The study is to be conducted in accordance with the Research Governance Framework.
3. A favourable opinion must have been given by the REC
4. All amendments (including changes to the local research team) need to be submitted in accordance with guidance in IRAS. Please also notify us of any changes to the status of your project.
5. Please note that the NHS organisation is required to monitor research to ensure compliance with the Research Governance Framework and other legal and regulatory requirements. This is achieved by selected audit of research, usually chosen randomly.
6. We recommend the enclosed documents for maintenance of your project site file to ensure all documentation is readily accessible for our audit.
7. Permission has been granted based on the following documentation:

   R&D Form *169621/748690/14/151*
   SSI Form *169621/746315/6/461/270470/318702*
   15 NW 0199 Spence Provisional Opinion.pdf
   Letter of Response.docx
   ZQ09 15 NW 0199 FIFO 24.03.2015.pdf
   Ethics Approval - 24.03.15.pdf

Client consent form V2.docx
CV - CI & Student.pdf
Supervisor CV.docx
Email invitation for research team members V2.docx
Email invitation to judges V2.docx
Information sheet for client V3.docx
Research Proposal V2 Part 1.docx
Research Proposal V2 Part 2 Appendix 10.docx
Research Proposal V2 Part 2 Appendix 11-18.docx
Research Proposal V2 Part 2 Appendix 1-4.docx
Research Proposal V2 Part 2 Appendix 19.docx
Research Proposal V2 Part 2 Appendix 5-6.docx
Research Proposal V2 Part 2 Appendix 7.docx
Research Proposal V2 Part 2 Appendix 8.docx
Research Proposal V2 Part 2 Appendix 9.docx
Scientific Approval Letter.doc
Insurance Certificate.pdf

Yours sincerely

Nick Bell
Director

Enc Site File Guidance
Amendment Log

ecc: Dr Andrew Thompson
Dr Stephen Kellett

Appendix C: Participant information sheet and consent form

The University Of Sheffield.

Department Of Psychology.
Clinical Psychology Unit.

Doctor of Clinical Psychology (Dclin Psy) Programme
Clinical supervision training and NHS research training & consultancy.

Clinical Psychology Unit
Department of Psychology
University of Sheffield
Western Bank
Sheffield S10 2TN UK

Telephone: 0114 2226650
Fax: 0114 2226610
Email: pcp12ces@sheffield.ac.uk

Cognitive analytic therapy and hoarding disorder

Thank you for showing an interest in taking part in this research study. This information sheet will talk you through the purpose of the study and what will be asked of you. It is important that you read this information sheet carefully and ask any questions that you may have. If you need to take some time to think about whether you would like to take part please let me know and we can agree to meet again to talk it through.

Why is the study taking place?

Research plays a central role in increasing our understanding of a range of psychological difficulties and helps us to know what types of therapy work and why they are helpful to people. The aim of the current research study is to explore whether a specific type of therapy called Cognitive Analytic Therapy (CAT) is helpful for people who experience problems with hoarding difficulties.

Why are you asking me?

I am asking you to take part because you have undergone a course of Cognitive Analytic Therapy to help you with your hoarding problems. Your therapist has spoken about the possibility of your involvement in this study and you have indicated that this is something you may be interested in.

What happens if I say yes?

If you say yes you will be asked to give written consent for your clinical notes to be accessed and used in this study.

Your clinical notes include the measures and interviews you completed during your treatment. These will be analysed and will allow us to determine whether therapy was helpful to you and whether it was responsible for any improvements in your symptoms.

You are not be required to do anything other than give your consent for your clinical notes to be accessed and used in this study. Your involvement in the study will therefore end after you have given written consent.

What happens with all the information?

After I have collected this information the next step will be to explore whether Cognitive Analytic Therapy was or was not helpful in reducing your problems with hoarding. This will be done in two stages:

1. In the first stage I will recruit two research teams who will be made up of trainee clinical psychologists from the University of Sheffield. Each team will be asked to review the data collected and to develop a case from one of two positions. One team will be asked to argue that therapy was helpful whilst the other will be asked to argue that therapy was unhelpful. Both teams will base their arguments on the data collected during therapy and may include scores from the measures you completed and the things you said during your interviews. Each team will be asked to develop an original argument (brief) supporting their position as well as a later counter-argument (rebuttal).
2. In the second stage I will recruit three independent judges who will be asked to review the data collected and the arguments developed by both teams. These judges will be qualified psychologists who will not be known to you. The judges will be asked to review all the available evidence and to make a decision as to whether therapy was helpful or unhelpful.

What happens after the study is finished?

I am required to write up this study in the form of a research report and present it as part fulfilment of my Doctorate of Clinical Psychology. Following I will also aim to promote our findings and submit this research study for publication. Publication of such research helps to contribute to our understanding of the usefulness of different therapies and adds to our knowledge about what helps. Such studies are usually published in professional journals and accessed most commonly by professionals or students.

Will people be able to recognise me?

Any information which may potentially identify you, such as your name or where you live, will be removed in order to protect your identity and maintain

confidentiality. As such only the lead researcher and your therapist will be aware of your involvement in this study.

All data collected will be kept in a safe and secure location and will not be viewed by any person outside of the research study. All individuals recruited to act as members of the research teams or independent judges will be informed that they are not permitted to disclose specific information relating to the study to any individual not directly involved in the research. All those participating will be required to sign to indicate there acknowledgement of such.

Although every effort will be taken to protect your identity it is important that you are aware that the level of detail required to assess whether therapy was helpful may inadvertently increase your risk of being identified. If you have any concerns about this please let me know so that we can discuss these concerns directly.

What else do I need to know about the study?

You may be interested in looking at the information I collected after it has been analysed. If this is the case I would be happy to meet with you after the research has been completed to review your scores. Please let me know if you would like this and we can arrange a suitable date to meet again.

In order to recruit judges with the required expertise it may be necessary to recruit from outside of the United Kingdom (UK). You will therefore be asked to give your consent to send information collected for the purpose of this study outside of the UK. As detailed above, all information will be anonymised with any identifiable details removed.

In order to ensure that all sensitive information relating to yourself and collected for the purpose of this study reach their intended recipients (judges) all information will be sent via recorded delivery. Judges will be required to keep this information in a safe and secure location and return all information relating to the study once their involvement ceases. Recorded delivery will again be required.

Do I have to take part?

No, you do not have to take part if you do not wish. Your involvement in this study is completely voluntary and you can decline without giving a reason. If after reading this information sheet you are happy for your clinical notes to be used in this study you will be asked to read and sign a written consent form.

If you later change your mind and wish to withdraw it is important that you are aware that you can only do so up until the data has been collected for analysis. Following it would not be possible to withdraw your consent. Please note due to the timescale of the study this is likely to be within 4 weeks of giving your consent.

Who has ethically reviewed the project?

This research study had been approved internally within the Clinical Psychology Department at the University of Sheffield. Ethical approval has also been granted by the NHS ethics committee.

What if I have a complaint?

If you have any concerns about the study or would like to make a complaint please contact the lead researcher on the email address above. Alternatively you can contact Dr Steve Kellett on s.kellett@sheffield.ac.uk

If you do not feel that your complaint has been handled to your satisfaction you should contact the university's registrar and secretary online: http://www.shef.ac.uk/ssid/procedures/grid

Thank you for showing your interest in taking part in this study. If you are still interested in taking part please read the following consent form carefully before giving your written consent.

Yours sincerely

Claire Spence
Trainee Clinical Psychologist and lead researcher
University of Sheffield

Research supervised by Dr Steve Kellett (Consultant Clinical Psychologist, University of Sheffield).

Name of Researcher: Claire Spence, Trainee Clinical Psychologist

Name of Supervisor: Dr Steve Kellett, Consultant Clinical Psychologist

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1. I confirm that I have read and understand the information sheet dated 19th March 2015 (version 3) explaining the above research study and that I have been given the opportunity it ask any questions I may have. ☐

2. I understand that my participation is voluntary and that I am free to withdraw without giving a reason. I understand that my withdrawal would not incur any negative consequences. ☐

3. I understand that all identifying information will be removed prior to being made available to the research teams and judges. I thereby give my permission for the research teams and judges to access my anonymised information collected for the purpose of this study. ☐

4. I give my permission for anonymised information collected for the purpose of this study to be sent outside of the UK and understand that recorded delivery will be used to ensure safe transportation. ☐

5. I understand that the level of detail required for this study may increase my risk of being identified. I understand that all efforts will be taken to protect my identity throughout the study and in the completion of any reports that arise as a result. ☐

6. I agree to take part in the above research study. ☐

Name	Date	Signature
Name of person taking consent	Date	Signature

Appendix D: Daily diary

Daily Diary

Today's Date:

How hard have I worked on **my real problems** today….

1 2 3 4 5 6 7 8 9

(Not at all) (All day)

Today, I have **acquired** (put the letter **'s'** next to stuff that you have stolen in the list)

Today, I have **discarded** (please list)

My levels of anxiety today have been:-

Morning 1 2 3 4 5 6 7 8 9

Afternoon 1 2 3 4 5 6 7 8 9

Evening 1 2 3 4 5 6 7 8 9

(Not at all) (Somewhat) (Very)

Appendix E: Session Impact Scale

Removed for copyright reasons

Removed for copyright reasons

Appendix F: Change Interview

Removed for copyright reasons

Removed for copyright reasons

Appendix G: Judgment questions

Part A:
When making your decision you are asked to provide a brief statement answering the following:

A. Did the client change over the course of therapy?
B. Is this change due to the effect of therapy?
C. What factors (including mediators and moderators) may be responsible for the change?

In explaining your answers please indicate which evidence, in particular, informed your decisions.

Part B:
Using the anchors provided please could you then rate the next four questions:

1. To what extent did the client change?
2. How certain are you?
3. To what extent is this due to therapy?
4. How certain are you?

Anchors:	No change/0%	Slightly/20%	Moderately/40%
	Considerably/60%	Substantially/80%	Completely/100%

Part C:
Finally, please give a final verdict as to whether the AFFIRMATIVE or SKEPTIC position presents the best case as to the efficacy of CAT for hoarding. Please base your final verdict on the defined standard of ‘clear and convincing evidence’ which is set at a probability level of > 80%.

Appendix H: Example CI summary (end of treatment)

Medication:

- Client takes Lisinopril daily for high blood pressure.

General experience of therapy:

- Client reported that therapy had been “very helpful” and that he had learnt a lot about himself that he didn’t realise.

Client’s description of himself:

- Client described himself as a musician and said that he liked to keep fit.

Client’s description of how others view him:

- Client said that others would say he moans a lot.

Changes noticed by client since therapy:

- Client learnt that he had a slightly superior attitude.
- Client reported that therapy had helped him to think in a more adult way.

Changes that didn’t take place:

- Client stated that he wished his problems were sorted quicker. Client said that he was addicted to eBay and buying things cheap.

Attributions for cause of changes:

- Client said he was the one that did the hard work but that the therapist guided him along the path. He said he appreciated all the effort the therapist put in.

Helpful aspects of therapy:

- Client stated that he would feel guilty if he went to sessions without doing any work and that this probably made him do more.

External events that were helpful:

- He said the money he could obtain from renting his house and the realisation that someone would have to sort his house out for him if he died were motivating factors.

Difficult aspects of therapy:

- Client stated that he sometimes used to feel exhausted after the session.

Unhelpful aspects of therapy

- Client said that he found completing the diary sheets “a bit tedious”.

Appendix I: Example CI summary (end of follow-up)

Medication:

- Client went to the GP approximately one month ago and was advised to take antidepressants.

General experience of follow-up:

- Client reported that the follow-up period was “quite difficult”. He said that he got used to seeing the therapist every week.

Client’s description of himself:

- Client described his hobbies as an “escape from reality” and an “elaborate system of avoiding the harsh realities of life”.

Client’s description of how others view him:

- Client said his partner would describe him as reasonably intelligent and with a sense of humour.

Changes noticed by client since therapy ended:

- Client recognised that he had been talking about his problems for years and has had lots of therapy.

Changes that didn’t take place:

- Client stated that he was disappointed that he hadn’t made more progress. He stated that one of his aims was to clear out one room.

Attributions for cause of changes:

- Client stated that the changes were brought about by his hard work with the help of the therapist.

Helpful aspects of therapy/follow-up:

- Client described filling in sheets which showed him that he collected more stuff than he disposed of.

External events that were helpful:

- Client reported that attending his father’s funeral had given him a sense of urgency as he had started to think about how long he may have left to live.

Difficult aspects of follow-up:

- Client said that it was easier when he saw the therapist every week.

Unhelpful aspects of follow-up:

- Client stated that it would have been helpful to have the therapists contact details so that he could contact him if he was struggling.

Appendix J: AT brief

Medication:

- The client was not receiving any medication for his mental health throughout the period of time in which he was undergoing treatment.

Nomothetic measures:

- The client's score on the Brief Symptom Inventory (BSI) shows both reliable and clinically significant change at the end of the intervention. This change is maintained at follow-up approximately 6 months later. The client's score on the Beck Depression Inventory (BDI) also reduces and shows reliable change at the end of the intervention and both reliable and clinically significant change at the end of follow-up.
- Reduction in the client's scores on the BDI and BSI is evidence that the client feels better, is less depressed, reports less psychopathology and is less distressed at the end of therapy. An improvement of this magnitude is likely to have a significant and positive impact on the client's general wellbeing.
- Lack of change observed on the hoarding specific measures, Saving Inventory Revised (SI-R) and Clutter Image Rating (CIR), is not consistent with the improvement reported by the client, during the intervention phase, in the number of items acquired and discarded each day. This may raise doubts as to the sensitivity of these measures to change.

Idiographic measures:

- The A/B design demonstrates that the active (intervention) phase of therapy was effective with observable improvements in acquisition, discard and anxiety levels. Rates of daily discard increased with the client continuing to discard more in the follow-up period than during the baseline phase. The clients ratings on measure 1 (how much have I worked on my real problems today?) remain stable, as opposed to the baseline phase where it shows a deteriorating trend. Stabilising of the client's commitment to work on his problems was a specific treatment target and corresponds with improvements on the remaining idiographic measures.
- Significant life events (e.g. death of the client's father) are likely to explain the negative trends observed during the follow-up period. Loss was significant in the client's development of problems with hoarding so it is expected that this would have a detrimental impact on the client's acquisition and discard behaviour.

Session Impact Scale (SIS):

- Scores on the SIS indicate that the relationship and the task were rated highly and followed a similar pattern throughout. This pattern is

expected given that CAT explicitly focuses on both the therapeutic relationship and the task of therapy (facilitating insight and working on identified problems).

Client and therapist letters:

- The client speaks of developing greater insight into his problems. This is evidenced in his goodbye letter to the therapist where he writes “now I can see that I have a problem with hoarding”. The client also refers directly to the CAT map and indicates that this was central in developing his understanding into his problems.
- The client states that he is “in a place to change now”. This suggests that the client feels that he is in a different place compared to before he started therapy. This statement also suggests that the client feels empowered to change.
- The therapist’s goodbye letter to the client details how “there are now some channels downstairs, where once there was walls of stuff”.

Client change interviews:

- During both interviews the client attributes the cause of change directly to the therapy he received. He repeatedly describes the therapy as “very helpful” despite finding some aspects of the therapy “tedious” (diary sheets) and frustrating (topics not getting covered, therapist collecting him 5 minutes late). The client states that “he had learnt a lot about himself that he hadn’t realised before”.
- The client describes the therapist as a “catalyst” and says that he “guided him along a path” but that he was the “one that had to come up with the answers” and then “internalise them”. This implies a process of growth towards a path of change or recovery and suggests that the client’s own role in the process of change was significant.
- At the end of the intervention the client rates all four changes as very unlikely to occur without therapy and extremely important to him. A similar theme of changes being important and unlikely to occur without therapy was also reported at follow-up.
- The client refers to the exits detailed on his CAT map and speaks of therapy facilitating him to learn and put into action new skills, e.g. planning and setting small achievable goals. The client states these skills are helpful when trying to de-clutter his house.
- The client states that therapy was “hard work” and had revealed things about himself that had been “difficult”. This experience of therapy is expected as the intervention aimed to help the client work on his problems and retreat into his ‘fantasy world’ less. It is possible that the true benefits of therapy are ‘masked’ by the challenges/anxiety that being in therapy triggers for the client. This may explain the sudden

positive changes (idiographic measures) following the end of the intervention phase.

CAT specific factors:

- The client refers to therapy providing him with increased recognition and greater insight into his problems which is consistent with the reformulation and recognition phases of CAT. There is evidence of behavioural change on the idiographic measures towards the end of the intervention phase. This is consistent with the revision stage of CAT.

Competence of the CAT delivered:

- The CCAT score was high indicating a good level of competence.
- The therapist was suitably qualified as an accredited CAT practitioner. Throughout the client's treatment the therapist is undergoing further CAT training and receives CAT supervision from a qualified CAT practitioner.

Changes CAN be attributed to the CAT intervention:

- It is the affirmative team's view that the client moves from a position where he views his difficulties in an ego-syntonic to ego-dystonic way and that this change can be directly attributed to the CAT. Following therapy the client also reports greater insight and awareness into his difficulties which is central to the CAT model and essential if later behavioural change is to take place.
- The therapeutic relationship is a direct focus in CAT with this providing the space for growth via the internalisation of a positive relationship with another person. The relationship with the therapist was central to the client's experience of therapy and facilitates the positive learning that takes place.
- Prior to therapy the client reports lifelong (30 to 40 years) and stable problems with hoarding and acquiring. The client has previously engaged in 20 sessions of Cognitive Behavioural Therapy (CBT) which is reported to have been clinically ineffective. The affirmative team suggest that CBT places less of an emphasis on the therapeutic relationship and interpersonal dynamics which may explain the lack of positive change following the client's previous treatment.

Appendix K: ST brief

Hoarding measures:

- The client's scores on the Saving Inventory - Revised (SI-R) show little change. He scores highly above the suggested clinical cut-offs for the total score and the three subscales at both time points, suggesting that the client continues to experience clinically significant problems with hoarding after the intervention.
- Ratings on the Clutter Image Rating (CIR) scale show little improvement. Ratings for all three rooms are highly above the suggested cut-offs indicating clinically significant problems with hoarding. The example pictures are consistent with the scores on the hoarding measures with severe problems indicated. There are no ratings available at the end of the intervention so it is not known what change, if any, occurred at this point.

General measures:

- The client's score on the Beck Depression Inventory (BDI) shows a reliable and clinically significant change at follow-up only. As this change did not occur during the intervention phase it cannot be attributed to the therapy itself and is likely to reflect life events that occurred during the follow-up period. Positive change at the end of the intervention is not clinically significant.
- The client's score on the Brief Symptom Inventory (BSI) at the end of the intervention remains above the suggested clinical cut-off. This indicates that the client continues to experience clinical levels of distress. No further improvement is observed at the end of follow-up.

Idiographic measures:

- Trendlines indicate minimal improvement during the intervention phase on four out of the five measures (item acquisition, items stolen, item discard and anxiety levels morning, afternoon and evening). Improvements are not sustained during the follow-up period with all trendlines showing clear deterioration.
- The client's daily rating of item acquisition and items stolen show an improving trend during the baseline phase.
- Ratings on the client's idiographic measures (worked on problems; item acquisition; anxiety morning and afternoon) show a sudden and sharp improvement at the point of therapy (intervention) ending which are not sustained in the follow-up period. This reflects the client's desire to demonstrate that therapy is successful and indicates that the client's responses are influenced to a degree by 'social desirability'.

Session Impact Scale (SIS):

- The SIS indicates that the client values the relationship more than the task. This suggests that the relationship with the therapist is more important than the type of therapy (CAT) the client received.
- The client's responses on the SIS are likely to have been influenced by a degree of 'social desirability'.

Client change interviews:

- The client gives a 'scripted' account of the therapy and the changes he experienced with a lack of unhelpful aspects reported. This indicates that the client presents a positive account of the therapy for the benefit of the therapist and the interviewer(s).
- The client states during the end of intervention interview that "learning all these new things about himself made him depressed". This contradicts the reduction in the BDI score, which raises doubts as to the reliability of the client's self-report scores on this measure and/or his disclosures during interview.

Process issues:

- The client does not appear to be fully aware of the role of endings as a trigger for his problems with hoarding. This is supported by the therapist's goodbye letter which states in relation to the ending of therapy "you have at times signalled that you feel that I may have been making too much of it". This suggests that the client may not have been fully engaged or invested in the process of CAT.
- The client states that he wished that "his problems were sorted quicker". This suggests that the client continues to externalise his problems and 'live in his fantasy world'.

Motivation and stage of change:

- The client recognises a lack of motivation to change stating during the end of intervention interview that he has been the "same way for thirty or forty years". It was the skeptic team's view that the client remains in the contemplation stage of change at the end of therapy (intervention).
- The client acknowledges that it would take him "5 years to empty his house" at his current rate.

Social desirability:

- The majority of the measures are self-report and are susceptible to reporting bias with the client's responses a reflection of his desire to 'please' the therapist. This is supported by the client's statement during the end of intervention interview that he felt "guilty if he went to sessions without doing any work". Additionally, the client reports that he found completing the diary sheets "tedious" which may cast doubt as to their accuracy and reliability.

- There is a degree of 'social desirability' in the client's goodbye letter. The wording suggests that the client may have written what is expected of him (e.g. "thank you for helping me so much – I have learnt so much about myself and feel in a place to change now").
- The formulation acknowledges that the client charms and manipulates people. This fits with the client presenting a biased and positive account of his experience of therapy in order to 'please' the therapist. The client's superior attitude may also have resulted in a reluctance to report that he has not found the therapy helpful.
- The narrative formulation speaks of it being the client's 'last chance' indicating the presence of a strong pull to attribute positive changes to the therapy.

Lack of change:

- Although the client reports that therapy "helped him think" there is a lack of evidence that this led to changes on a behavioural level and that the client is using the exits detailed within his formulation. This is evidenced by the lack of change in the client's acquisition and discard behaviour and the client's statement during the end of intervention interview that "his therapist had recommended that he meet more people but that he hadn't done this".
- The client reports saying to himself "when are you actually going to start throwing things away" and that "he hoped" he would get better. The client also states that he continues to be "addicted to eBay and buying things cheap". This suggests an awareness by the client that his difficulties have not improved.

Competence of the CAT delivered:

- A score of 32 out of 40[1] indicates that only 80% of the session rated was competently delivered. The remaining 20% may reflect an absence of CAT specific competencies.
- Only one session was rated raising doubts as to whether this is an accurate reflection of other sessions. The therapist may have tried harder when the session was tape recorded resulting in the score being substantially lower for all other sessions.

Extra-therapy events:

- The client states that he went back to his GP's and was offered anti-depressants for his mood. This suggests that the client did not experience an improvement in his mood and contradicts his score on the BDI.
- The client acknowledges that factors external to therapy (e.g. turning 65 years old, father's funeral and the money he could get from renting his house) were central in increasing his motivation to change and

providing a sense of urgency to deal with his problems. These events are likely to be responsible for any changes experienced by the client and would have occurred naturally irrespective of the therapy.

Changes CANNOT be attributed to the CAT intervention:

- It was the skeptic team's belief that the client valued the relationship with the therapist more than the therapy itself. This relationship provided the client with a space to talk, 'feel important' and gain validation. It was felt that it was this relationship that brought about any improvements reported by the client. This is supported by the client's deterioration, as evidenced on all of the idiographic measures, during the follow-up period when there was a reduction in the availability of this relationship.
- The benefits of the therapeutic space over that of the type of therapy received is supported by the fact that the client does not mention CAT during both interviews referring only to the benefits of talking about his problems. It is therefore likely that the client would have benefitted from any supportive relationship which provided a space to explore his difficulties.
- The client's request for the therapist's contact details supports the idea that he valued the relationship with the therapist. Any improvements are therefore likely to be an artefact of the client's relationship with the therapist and 'social desirable' responding and not as a result of the CAT he received.

[1] Note: A cut-off competency score of 20 is reported in the literature. No formal cut-off scores were provided to the AT or ST.

Appendix L: AT rebuttal

Hoarding measures:

- The Clutter Image Rating (CIR) scale is susceptible to a ceiling effect preventing the measurement of clutter above the highest available rating of nine. Any reductions in the client's level of clutter to this level cannot be assessed.
- The client collects/steals a large number of small items (e.g. shampoo bottles, razors). It is unlikely that the CIR would capture a reduction in the level of clutter based on the removal of items of this size. Successful discard of small items is however likely to be viewed positively by the client.

General measures:

- The reduction in score on the Beck Depression Inventory (BDI) shows a reliable and consistent decline over the period in which it was assessed with the client's symptoms gradually reducing in severity level. A reduction of such a magnitude, at both time points, is likely to have had a positive impact on the client's wellbeing and be viewed as meaningful by the client.
- Improvements at the end of the intervention on the Brief Symptom Inventory (BSI) are maintained at the end of the follow-up period. This indicates that real and meaningful change has taken place. The client's score was only three points above the cut-off level suggesting that the client presents at the very low end of the clinical range.
- The BDI and BSI have strong psychometric properties, including reliability coefficients, and have been validated in clinical and non-clinical populations.
- The client spoke of significant life events (e.g. death of his father) which are likely to have had a negative impact on his wellbeing. Such life events are unlikely to have resulted in the reduction in score on the BDI and BSI.

Idiographic measures:

- Improvements on the idiographic measures are unlikely to be experienced as 'minimal' by the client and were in fact described as meaningful during both interviews. The client demonstrates an increased rate of discard during the intervention phase and continues to discard during the follow-up period. Gradual improvements are more sustainable in the long term.
- It is difficult to draw any conclusions on the measure of items stolen each day due to the floor effect observed.
- Improvement during the baseline phase is not consistent across the idiographic measures with some measures showing a deteriorating trend. Any improvements during the baseline phase cannot be

attributed to the therapeutic relationship, as evidenced by the declining trend on the relationship subscale of the Session Impact Scale (SIS).

- It is unlikely that a client would respond in a 'socially desirable' way at the point that therapy ended (intervention). It is the affirmative team's experience that clients commonly experience the ending of therapy as difficult and report greater problems/symptoms. Greater anxiety levels during the intervention phase is expected as the client was required to 'face' his problems. This fits with the formulation of his 'fantasy world' being an avoidant coping strategy

Session Impact Scale (SIS):

- The affirmative team suggest that the therapeutic relationship is a central component of CAT and is one of the main mechanisms for bringing about change.
- The client consistently reports unhelpful aspects of therapy on the SIS indicating that the client is not responding in a 'socially desirable' way.

Client change interviews:

- The affirmative team do not believe that the client gives a 'scripted' account of therapy. Such a view 'dismisses' the client's own account of therapy and the changes he experienced. It is suggested that the client presents a realistic account of his problems and the progress he has made. This is supported by the client's own statement that he currently "works on the house two hours a day and hopes to do more".
- The client identifies unhelpful parts of therapy (e.g. tediousness of diary sheets, topics not being covered in sessions, feeling frustrated by the therapist). This does not fit with the view that the client is attempting to 'please' the therapist/interviewer(s).
- The client experiences emotions such as regret, shame and sadness which are expected and are a natural part of the therapeutic process of learning about yourself. These feelings do not equate to depression in a clinical sense and would not be picked up by the BDI measure of clinical depression.

Process issues:

- The client acknowledges that he was not fully aware of the impact of endings but that he later understood what the therapist meant describing the ending as "difficult". This is a 'normal' response to the ending of therapy which is experienced by many clients irrespective of the model of therapy.
- The client's willingness to write a goodbye letter to the therapist is evidence of active engagement in the process of CAT. A high level of engagement is also supported by the client's attendance at further follow-up appointments and two interviews.

- It is a normal expectation for clients to want their problems to resolve at a greater pace. However, the client's recognises that this is unlikely to happen which reflects greater acceptance of his own responsibility, reduced externalisation and a 'step out of his fantasy world'.

Motivation and stage of change:

- The affirmative team agree that the client appears to be in the contemplation stage of change. However, they suggest that it was the therapy that facilitated the client's movement into this stage. It is also suggested that the client has shown early sign of movement into the action stage of change. As this process is cyclical the affirmative team suggest that it is likely that the client will move forwards and backwards between these phases for a period of time prior to any maintenance of new skills being evident.
- The client states that prior to therapy that he was not working on his house. Without therapy his problems were therefore likely to stay the same or show further deterioration. Although it may take the client five years to empty his house this is evidence of significant change as a result of the therapy.

Social desirability:

- The client's recollection of feelings of guilt if he went to sessions without doing any work suggests that he did not always act in a way which would be 'pleasing' to the therapist. The affirmative team suggest that 'tedious' does not equate to the client's responses on the diary sheets being unreliable.
- The client's goodbye letter is consistent with his reflections made during the interviews. The interviews were conducted by an independent person(s) challenging the idea that the client gave a positive account of therapy in an attempt to 'please' the therapist.
- The client has previously engaged in CBT therapy which was ineffective and resulted in the client later seeking further therapy. This challenges the idea that the client is reluctant to acknowledge when therapy has been unhelpful. The client also refers to a threat made by him to steal the therapist's bike. It is suggested that this is not a 'socially desirable' response.
- The affirmative team suggest that it is likely that the client would demonstrate greater positive change on each of the outcome measures if he was responding in a 'socially desirable' way. The client's scores do not suggest this is the case.

Lack of change:

- Scores on the BDI and BSI indicate that the client felt less depressed and less distressed at the end of therapy.

- The affirmative team suggest that not all changes that result from therapy are behavioural. The client describes substantial cognitive changes including greater insight and clearer 'adult' like thought processes. In addition, the client refers to the benefits of planning, setting smaller goals and working on the house for two hours a day which suggests that he is successfully employing the exits learnt during therapy.

Competence of the CAT delivered:

- It is unrealistic to expect any therapist to score 100% competence. A manualised approach was not employed and the therapist was responsive to therapist – client process issues.
- The therapist was supervised by an accredited supervisor supported by videotaping of sessions. Ratings of competence may have been higher during non-videotaped sessions due to the likely negative impact of performance anxiety.

Extra-Therapy Events:

- The client was ill when he returned to the GP's and was offered anti-depressants. The client opted not to take this medication suggesting that he felt better shortly afterwards.
- Although life events may have provided a sense of urgency it was the affirmative team's view that the client's recognition of the need for change originated from the therapy he received.

Changes CAN be attributed to the CAT intervention:

- The affirmative team suggest that CAT is a relational and process driven model and agree that it was this experience of a relationship with another person that brought about positive change for the client. However, it is the affirmative team's view that this change was unlikely to have occurred as a result of a different therapeutic model. This is supported by the client's lack of change following previous CBT. The client also repeatedly refers to the CAT as "helpful". It is unrealistic to expect a client to talk about the specific therapy they received using technical language.
- The affirmative team suggest that the relationship provided more than validation and support and in fact challenged the re-enactment of the client's reciprocal role patterns. The client's request for the therapist's details can be attributed to the fact that 'endings' can be difficult.

Appendix M: ST rebuttal

Medication:

- The skeptic team suggest that the client's medication history is irrelevant as the primary hoarding outcome measures indicate little change.

Nomothetic measures:

- The skeptic team agree that the client's scores on the Brief Symptom Inventory (BSI) and Beck Depression Inventory (BDI) show some improvement. However, the skeptic team suggest that the intervention was not intended to treat depression or general psychological distress but was in fact intended to treat the client's problems with hoarding. The client's BSI score also remains above the defined clinical cut-off indicting a continuation of clinical levels of distress.
- It is the skeptic team's view that the therapy was not successful in targeting and reducing the client's problems with hoarding. This view is evidenced by the lack of change on the hoarding specific measures. The skeptic team are of the opinion that the client's problems with hoarding are the primary motivator for seeking therapy. It is therefore likely that a lack of improvement in the client's problems with hoarding would have a negative impact on his general wellbeing.
- The Saving Inventory-Revised (SI-R) and Clutter Image Rating (CIR) are validated measures used frequently in hoarding research. This indicates that they are in fact sensitive to change.

Idiographic measures:

- Daily ratings on the idiographic measures show minimal levels of change with any improvements not maintained during the follow-up period. Rates of daily discard at follow-up is barely above the baseline median.
- Increased commitment to work on his problems, reduce acquisition and increase discard during the intervention phase is likely to be a result of the client's ongoing relationship with the therapist and is therefore not specific to the therapy.

Session Impact Scale (SIS):

- The skeptic team believe that the SIS is highly susceptible to 'social desirability' and once again suggest that the client's responses are an attempt to 'please' the therapist.

Client and therapist letters:

- The skeptic team suggest that the client entered therapy with a degree of insight into his problems with hoarding, as without some level of insight it is unlikely that the client would have sought help or identified

acquiring and discarding as potential treatment targets. It is the skeptic team's view that greater levels of insight reflects a natural process of growth and is therefore not attributable to the therapy.

- Although the therapist speaks of there being 'channels' in the clients home there is no clear evidence of such. The high CIR scores are consistent with significant levels of clutter depicted in the example pictures.

Client change interviews:

- It is the skeptic team's view that the client's description of therapy is 'overly positive' and gives a 'socially desirable' account for the benefit of the therapist and the interviewer(s)/researcher. The skeptic team suggest that the client's description of change is not supported by the scores/ratings on the idiographic and hoarding specific outcome measures.
- Although the client refers to both the CAT map and the learning of new skills the skeptic team suggest that there is a lack of evidence indicating that the client is employing these skills to good effect. It is the skeptic team's experience that clients often find it hard to distinguish between the therapeutic relationship and the therapy and suggest that this may explain the client's description of the 'therapy as helpful'.
- The skeptic team agree that therapy can be a source of anxiety to clients. However, they disagree that this would 'mask' the true benefits of therapy or explain the sudden improvements following the end of the intervention phase. Once again the skeptic team suggest that this is likely to reflect the client's natural desire at the point of ending to prove that therapy has been helpful.

CAT specific factors:

- The skeptic team suggest that the aim of CAT is to facilitate the client to make the necessary changes, and for change to be evident and show a level of maintenance following termination of the therapy. It is suggested that there is a lack of evidence of consistent and sustained behavioural change on the client's idiographic measures and the hoarding specific measures.

Competence of the CAT delivered:

- The therapist was undergoing further CAT training of which the client was used as a training case. The client will have consented to this process which may have inadvertently placed greater pressure on the client to report that positive change has occurred and that therapy has been beneficial.
- There is little measurement of therapist adherence to the CAT model. The skeptic team suggest that therapist drift may have occurred.

Changes CANNOT be attributed to the CAT intervention

- The skeptic team suggest that the therapeutic relationship is a central component of all therapeutic models and is therefore not specific to CAT. It is suggested that the client valued the relationship with the therapist more than the therapy itself and that any changes reported by the client were the direct result of his wish to 'please' the therapist. This view is supported by the client's deterioration during the follow-up phase when access to the therapist was reduced significantly.
- It is the skeptic team's view that the client both began and ended therapy in the contemplation stage of change. The client's request for help with his problems with hoarding is evidence that the client had insight into his problems prior and therefore did not come about as a result of the therapy.
- The skeptic team suggest that the difficult process of ending therapy and the sudden loss of the relationship with the therapist may lead clients to hold a largely negative view of previous therapies. The skeptic team are of the opinion that the clients account of therapy would likely have differed, with a less positive account being presented, if a greater period of time had elapsed between the client's last follow-up session and the final interview.

Appendix N: Closing summaries

It is the affirmative team's view that the client experienced substantial cognitive and emotional changes with the client showing evidence of early behavioural change. The affirmative team recognise the value of a positive therapeutic relationship and suggest that this is the primary mechanism for change within CAT. With this in mind it is the affirmative team's opinion that the client did experience meaningful change and that the changes experienced by the client are directly attributable to the CAT.

It is the skeptic team's view that the client did not experience meaningful change with little change observed in the client's problems, particularly in hoarding and acquiring. The skeptic team suggest that the client valued the relationship with the therapist more than the therapy itself with the client's account of therapy and the changes he reported an artefact of his desire to 'please' the therapist. With this in mind the skeptic team are of the opinion that any changes reported by the client cannot be attributable to the CAT.